EXHIBIT 7

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

ENTROPIC COMMUNICATIONS, LLC, Plaintiff, v. CHARTER COMMUNICATIONS, INC., Defendant.	Civil Action No. 2:22-cv-00125-JRG

REBUTTAL EXPERT DECLARATION OF RICHARD A. KRAMER PH.D.
REGARDING CLAIM CONSTRUCTION

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a. A POSITA would understand, in view of the intrinsic evidence, that not all parameters "compris[e] a form for the probe" 52

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b. I disagree with Dr. Almeroth's opinion that "worst case" SNR is unintelligible or always 0 in the context of Claim 1 60

2. "[communicating with/corresponding to] said one of said plurality of service groups" 61

a. Among other things, Dr. Ameroth is wrong that there is no antecedent basis 61

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I, Richard A. Kramer, declare as follows:

I. INTRODUCTION

1. I am over the age of 18 and am competent to make this Rebuttal Declaration ("Declaration"). I have personal knowledge, or have developed knowledge of these technologies based upon education, training, or experience, of the matters set forth herein. If called upon to do so, I would testify competently thereto.

2. I have been retained by counsel for Entropic Communications, LLC ("Entropic") in the above-captioned action as an independent consultant to offer opinions regarding how a person of ordinary skill in the art would understand certain claim terms in U.S. U.S. Patent No. 8,223,775 (the "'775 Patent"); U.S. Patent No. 8,284,690 (the "'690 Patent"); and U.S. Patent No. 10,135,682 (the "'682 Patent"), (collectively, the "Patents at Issue"). Specifically, I am submitting this Declaration to address the meaning and construction of certain disputed terms in response to the Expert Declaration of Dr. Kevin Almeroth Regarding Claim Construction. For the purposes of this Declaration, I have not been asked to opine on the meaning of any other disputed terms not addressed below.

3. In forming my opinions, I understand that the claims should be interpreted as they would be understood by a person of ordinary skill in the art ("POSITA") of the patent at the time its application was filed. I understand that the claims are to be construed with reference to the patent's specification, the claims, and the prosecution history, in light of the plain meaning of the terms used in the claims, and with reference to other sources of information, such as dictionaries, textbooks, and literature or other patents in the same or related fields.

4. My opinions are based on my years of education, research and experience, as well as my investigation and study of relevant materials, including those identified in this Declaration.

5. I may rely upon these materials, my knowledge and experience, and/or additional materials in forming any necessary opinions. Further, I may also consider additional documents and information to rebut arguments raised by the Defendants. I reserve any right that I may have to supplement this Declaration if further information becomes available or if I am asked to consider additional information. Furthermore, I reserve any right that I may have to consider and comment on any additional expert statements or testimony of Defendant's expert(s) in this matter.

6. My analysis of the materials produced in this investigation is ongoing and I will continue to review any new material as it is provided. This Declaration represents only those opinions I have formed to date. I reserve the right to revise, supplement, and/or amend my opinions stated herein based on new information and on my continuing analysis of the materials already provided.

7. If requested, I am prepared to explain at a technology tutorial or claim construction hearing the technology disclosed in the Patents at Issue, including the state of the art around the filing dates of this patent. This may include, among other things, background information on communication systems, broadband communications systems / cable systems (*e.g.,* cable TV systems, HFC (Hybrid Fiber Coax) cable systems, etc.), satellite communication systems, RF (Radio Frequency)[1] systems, including systems architectures, components, and applications thereof for these types of systems. Any explanations that I may provide with respect to a technology tutorial or claim construction hearing may also include the use of visual aids or other demonstrations. I am also prepared to rebut, as necessary, matters raised by the expert(s) of

[1] "RF," which means "Radio Frequency," is a term and technology that not only applies to wireless systems, but also applies to terrestrial systems such as, for example, cable systems (including cable and/or HFC systems) and related devices. This was likewise true well before the earliest possible priority dates of the Patents at Issue.

Defendant Charter Communications, Inc. ("Charter")—whether in declarations, reports, depositions, or hearings—and to address related matters raised in the course of claim construction.

II. QUALIFICATIONS

8. In this section, I provide a summary of my educational background, employment background, and other relevant qualifications. A more detailed statement of my professional qualifications, including education, publications, honors and awards, professional activities, consulting engagements, and other relevant experience is included in my curriculum vitae, attached as Exhibit A to this Declaration, and is incorporated by reference herein.

9. I have 30 plus years of in-depth industry experience developing and deploying successful communication systems, broadband communications systems / cable systems (*e.g.*, cable TV systems, HFC (Hybrid Fiber Coax) cable systems, etc.), satellite communication systems, and RF systems, including systems architectures, components, and applications thereof for these types of systems—to name a few.

10. From 2007 to present, I currently serve as President of SIS Development, Inc. / Security Industry Services, Inc., an engineering and technical services company specializing in the technical areas of, for example, communication systems (including cable TV/broadband systems), video systems, wireless networking, Internet technologies, and client-server systems. Exemplary technical services that I have provided include assisting companies in the cable TV and communications industry. For example, I assisted a company in the development an SoC (System on a Chip) for a cable TV set-top box.

11. From 2003 to 2007, I served as the Vice President-Engineering and General Manager-Technology at GE-Security, a division of General Electric (GE) which is now owned by United Technologies Corporation (UTC). At GE, I was the lead engineer for the world-wide "Video Systems Group" that developed video products, multimedia communications systems and

products, and HFC based systems and products. At GE, I was also the lead engineer for residential and commercial security systems engineering and development for North America.

12. From 1998 to early 2003, I was the top technology leader at a number of high-tech start-up companies. Those high-tech start-up companies included Miraxis Corporation (a division of EMS Technologies, Inc., now Honeywell, Inc.). At Miraxis, I was the Vice President of Product Development from late 2001 to early 2003, developing IP network and digital video solutions in the satellite TV industry (*e.g.,* a DTH (Direct to Home) / DBS (Direct Broadcast Satellite) solution). As the Vice President of Product Development, I was responsible for all aspects of the system architecture and components to provide both multimedia content and two-way modem communications.

13. In 2000, I joined Ivex Corporation ("Ivex"), where I served as the Vice President of Engineering and led all technology development. At Ivex I led the development of video surveillance solutions including a product called the VSA (Video Streaming Appliance) and an Internet/network system/software solution called ViewOps. Our solutions allowed retail chains like Ace Hardware, Finish Line, and Eddie Bauer to remotely view their sites and facilities using servers. Further, the user could log into the ViewOps system to obtain pre-recorded events that were triggered by a wide variety of sensor inputs.

14. In 1998, I joined Home Wireless Networks, Inc., where I was promoted to Vice President of Engineering. At Home Wireless Networks, I led all engineering in the development of leading-edge wireless products, including 900 MHz RF circuits, antennas, and transceivers. Home Wireless Networks' products—which included the first integrated voice and low-cost IEEE 802.11 WiFi access point—were launched under the British Telecom and Telenor brands in Europe and the BellSouth and MCI brands in the United States. At the time we used well known

IC (Integrated Circuit) design methods and SoC (System on a Chip) design methods. For example, as Vice President of Engineering at Home Wireless Networks, I was responsible for the development of an SoC (System on a Chip) that integrated an ARM processor. The ARM processor core was provided to us in the form of a hardware library (*e.g.,* in the form of HDL (Hardware Description Language)) that we then integrated into our SoC as a whole. We then had an outside semiconductor foundry manufacture our SoC.

15. From 1995 to 1998, I was the engineering/technology leader for multimedia cable TV set-top boxes in North America for Scientific-Atlanta, Inc. (prior to being acquired by Cisco Systems, Inc.) within the Advanced Video Systems (AVS) Division. My group developed and successfully launched Scientific-Atlanta's first internally designed cable TV set-top box (also called an HCT which means Home Communication Terminal). The development of the cable TV set-top boxes that I led engineering for included responsibility for RF, analog, and digital design for the finished products.

16. At Scientific-Atlanta, in addition to my leadership in the development of cable TV products, I was also responsible for testing the products for our entire division as a whole. Subsequently, I directly managed the construction and operation of our own complete cable TV Head End (HE) system. When we designed products, we evaluated the performance of our products within the entire cable TV system including within the cable TV HE that we operated. Such evaluations of performance included the measurement and monitoring of a whole host of system impairments related to cable TV system two-way communications including those measurements related to SNR (Signal to Noise Ratio) and other modulation impairments.

17. At Scientific-Atlanta I was later promoted and served as the top technology leader on the Strategic Planning Team for the AVS Division, working on the next generation advanced

video products including the overall system design, software and HCTs. In this role, each of the functional technology areas including firmware, hardware, system software and cable system communication headend equipment reported to me in a dotted line matrix/cross-functional organizational structure for the development of our next generation of products and solutions.

18. As part of my responsibilities at Scientific-Atlanta, I stayed current with industry standards that we implemented into our systems such as, for example, the DOCSIS (Data Over Cable Service Interface Specification) standard, the MPEG (Motion Pictures Expert Group) standard, and various Internet/networking standards such as the SNMP (Simple Network Management Protocol) standard. Moreover, the products and solutions that I led the development of at Scientific-Atlanta included a plethora of technologies that included, for example, the development of cable TV communication circuits and systems and RF circuit design.

19. From 1987 to 1995, I held a number of technology positions at Schlumberger Industries, Electricity Management North America. From 1987 until 1989, I was an Electronic Design Engineer at Schlumberger. As an Electronic Design Engineer, I designed circuitry and firmware for solid-state electronic electric meters including the design of a PLC (Programmable Logic Controller) which was an IC that did not include a processor. I also designed an Application Specific Integrated Circuit (ASIC). The use of ASICs and PLCs were well known technologies at the time. I worked on many aspects of design for our core metering products including the design of AMR (Automatic Meter Reading) electronics. The electricity meters that I designed further employed a wide array of sensors to measure electric power consumption, low battery conditions, tamper detection, and the like.

20. In 1989, I was promoted to Senior Electronic Design Engineer at Schlumberger. In 1990, I was promoted to Hardware Manager of the Recorders and Translation Systems where I led

the development of data interfaces between electricity meters and a utility's remote central office. In 1994, I was promoted to Engineering Manager, Residential and Commercial Metering.

21. As Engineering Manager, Residential and Commercial Metering for Schlumberger, I oversaw product development of residential and commercial solid-state electronic electric meters for North America. For example, I was responsible for the engineering design of the "MACS" (Metering And Communications System) that was used to remotely read and control electricity meters installed within multi-tenant buildings using the existing power lines. We called this PLC (Power Line Carrier) communication technology. In fact, PLC was one of the first communication methods used for "Smart Homes" which at that time was in its early infancy. PLC was seen as a means to communicate between various appliances and the utility meter within a home. As part of my R&D (Research and Development) duties, I extensively researched Smart Home technology and PLC technology and as a result I attended a Parks Associates Smart Home workshop in or around 1994.

22. In 1984, I began work as an Electronic Design Engineer in the Nuclear Power Division at Babcock & Wilcox. I was later promoted to Senior Electronics Design Engineer.

23. In the Special Products and Integrated Field Services team at Babcock & Wilcox, my work involved designing and developing both: (a) monitoring systems to monitor the operation of the nuclear power plant equipment, and (b) inspection/robotic repair systems to inspect and repair nuclear power plant components inside the nuclear containment buildings. My work required me to implement a wide variety of sensor technologies into the control room monitoring and robotic systems that I designed.

24. Related to monitoring systems at Babcock & Wilcox, as just one example, I helped redesign portions of a Safety Parameter Display System (SPDS). The SPDS was a system used in

the control room of nuclear power plants to allow the operators to monitor the plethora of equipment and related sensors within a nuclear power plant. For example, such sensors determined temperature, the state of valves and other equipment (closed / not closed), water levels, pressure, and radiation levels to name a few.

25. Related to inspection/robotic repair systems at Babcock & Wilcox, I was one of the key designers of the electronics, software, and firmware (for measurement, control, and communications) for a robot called "ROGER" (Remotely Operated Generator Exam and Repair). My work in designing ROGER required me to work with a plethora of sensor technologies including cameras (to monitor activities and position of the robot), temperature sensors (for monitoring equipment health) and motion sensors (that enabled us to detect and control ROGER's position and movement within a nuclear power plant steam generator). My developments further implemented of cable TV systems to enable the visual inspection within that containment building and other high-radiation areas. ROGER was also outfitted with various exchangeable "tools" that allowed us to perform different types of inspections and repairs on nuclear steam generators which utilized a wide variety of sensor technologies to monitor remote equipment. The sensor states and parameters, including temperature and switch positions, were sent back via a dedicated serial communications network channel called "SDLC," to remote systems operated by personnel far away from the highly radioactive steam generator.

26. In 1984, I received a Bachelor of Science in Electrical Engineering, magna cum laude, from the University of Toledo.

27. In 2017, I received a Master of Science in Electrical and Computer Engineering from Oregon State University, where I graduated with a 4.0 GPA (Grade Point Average). My thesis, entitled "Optimization of Interactive Live Free Viewpoint Multiview Video Streaming

Bandwidth," was based on my own research in streaming multiview video over the Internet using peer-to-peer networks and wireless broadcast transmissions.

28. In 2022, I received a Ph.D. in Electrical and Computer Engineering from Oregon State University based on my academic research that I started in 2015. I graduated with a 4.0 GPA (Grade Point Average). My dissertation, entitled "Machine Learning Bandwidth Optimization of Interactive Live Free-Viewpoint Multiview Video for Sporting Events," was based on my own research combined with my applied industry knowledge in the fields of artificial intelligence, machine learning, classifiers, video / video detection / video analytics / video content prediction, and communication systems (including cable/HFC and satellite systems). The heart of my dissertation was to intelligently predict and then optimally communicate multimedia data over two-way DVB (Direct Video Broadcast) terrestrial systems (which include two-way DVB cable TV systems and DVB IPTV (Internet Protocol TV) systems)), two-way DVB satellite systems, and P2P (Peer-to-Peer) systems.

29. I am a member of the Institute of Electrical and Electronics Engineers (IEEE).

30. I am a lifetime member of the honor society of Phi Kappa Phi.

31. In 2003, I further attended Emory University's, Goizueta Business School and took numerous MBA (Master of Business Administration) courses. Emory's business school program at the time was ranked in the top 10 globally by Business Week and The Financial Times.

32. I have received two U.S. patents: (a) U.S. Patent No. 5,701,253, entitled "Isolated Current Shunt Transducer," which describes and at the time new transducer sensor design for measuring electricity, and (b) U.S. Patent No. and 5,422,939, entitled "Parallel Off-Hook Detection for Both Line-Available and Phone Pick-Up Detection," which describes an at the time new device for sensing the state of telephone lines.

III. COMPENSATION

33. I am being compensated for my services in this matter at my standard consulting rate of $725 per hour. I am also being reimbursed for expenses that I incur during the course of this work. My compensation is not contingent upon the results of my study, the substance of my opinions, or the outcome of any proceeding involving the challenged claims. I have no financial interest in the outcome of this matter.

IV. MATERIALS CONSIDERED

34. In preparing this declaration, I reviewed and considered the following materials, and any others referenced in the body of my declaration:

1) the Patents at Issue and their file histories, as well as the patents and file histories for the applications identified as Related U.S. Applications on the face of the Patents at Issue;

2) the parties' proposed claim constructions;

3) the Declaration of Dr. Kevin Almeroth Regarding Claim Construction ("Almeroth Declaration"); and

4) the extrinsic evidence cited herein.

35. I may use these documents and information, or other information obtained during the course of this or related proceedings, as well as representative charts, graphs, schematics and diagrams, animations, and models based on those documents and information, to support and to explain my testimony. I am informed that discovery in this action is ongoing and I reserve the right to modify or supplement my opinions, this declaration, and/or to submit additional declarations to address any information obtained, or positions taken, as discovery continues.

36. My opinions are based in part on a review and analysis of the above-mentioned documents and materials. The materials relied upon within this Declaration are of the type that an expert in my field would have reasonably relied upon in forming opinions. I have also drawn on

my education, experience, and knowledge of basic engineering principles for communication systems, broadband communications systems / cable systems (*e.g.*, cable TV systems, HFC (Hybrid Fiber Coax) cable systems, etc.), satellite communication systems, RF systems, including systems architectures, components, and applications thereof, that were already in use prior to, and within the timeframe of the earliest priority dates for the claimed subject matter in the Patents at Issue.

V. LEGAL STANDARDS

37. I am not an attorney or a patent attorney, and I offer no opinions on the law. I have, however, been informed by counsel regarding various legal standards that may apply to this case, and I have applied those standards where necessary in arriving at my conclusions.

38. I understand that patent claims are construed from the viewpoint of a person of ordinary skill in the art ("POSITA") at the time of the invention. I understand that this hypothetical POSITA is considered to have the normal skills and knowledge of a person in the applicable technical field. The factors that may be considered in determining the level of ordinary skill include: i) the education level of the inventor; ii) the types of problems encountered in the art; iii) the prior art solutions to those problems; iv) the rapidity with which innovations are made; v) the sophistication of the technology; and vi) the education level of active workers in the field.

39. I understand that the most important evidence to consider in construing the claims is the "intrinsic" evidence, which I understand includes the claim language, the patent specification, and the prosecution history, including *inter partes* review ("IPR") and other post-grant proceedings with the United States Patent and Trademark Office's ("USPTO") Patent Trial and Appeal Board ("PTAB").

40. I further understand that a POSITA must read the claim terms in the context of the claim itself, as well as in the context of the entire patent specification. I understand that in the

specification and/or prosecution history, the patentee may specifically define a claim term in a way that differs from the plain and ordinary meaning of the term. I understand that the prosecution history of the patent is a record of the proceedings before the USPTO and may contain explicit representations or definitions made during prosecution that affect the scope of the patent claims. I understand that an Applicant may, during the course of prosecuting the patent application, limit the scope of the claims to overcome prior art or to overcome an Examiner's rejection, by clearly and unambiguously arguing to overcome or distinguish a prior art reference or by clearly and unambiguously disclaiming claim coverage.

41. In interpreting the meaning of the claim language, I understand that a POSITA may also consider "extrinsic" evidence, which consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, positions taken by the patent owner in other litigations, dictionaries, and learned treatises. I understand that extrinsic evidence may not be relied on if it contradicts or varies the meaning of the claim language provided by the intrinsic evidence, particularly if the Applicant has explicitly defined a term in the extrinsic record.

42. I also understand that patent claim may not be interpreted one way to avoid invalidity and another way to find infringement. In other words, a claim must be read the same way for validity as for infringement.

43. I understand that Section 112 of the Patent Laws requires that a patent claim particularly point out and distinctly claim the subject matter that the Applicant regards as his or her invention. I understand that a patent claim is invalid for indefiniteness if it fails to inform, with reasonable certainty, a person of ordinary skill in the art about the scope and bounds of the invention claimed. I understand a claim is indefinite if its scope is not clear enough that a POSITA could have determined with reasonable certainty whether a particular embodiment infringes the

claim. I also understand that when considering whether a claim is indefinite, a POSITA may consider both the intrinsic and extrinsic evidence.

44. I understand that a term may be found to be indefinite when the claim language is facially subjective or ambiguous and the meaning of a term and/or scope of the claims is not "reasonably certain" to one skilled in the art.

45. I understand that failure to provide explicit antecedent basis for a term does not always render a claim indefinite. If the scope of a claim would be reasonably ascertainable by those skilled in the art, then the claim is not indefinite.

46. I understand there are instances where inherent components of elements recited have an antecedent basis in the recitation of the components themselves. For example, the limitation "the outer surface of said sphere" would not require an antecedent recitation that the sphere has an outer surface.

VI. LEVEL OF SKILL IN THE ART

47. In rendering the opinions set forth in this Declaration, I was asked to consider the patent claims and the prior art through the eyes of a person of ordinary skill in the art ("POSITA"). The "art" is the field of technology to which a patent is related. In my Declaration, I use the term POSITA to refer to the same hypothetical person of ordinary skill in the art. I considered factors such as the educational level and years of experience of those working in the pertinent art, patents and publications of other persons or companies, the sophistication of the technology, the types of problems encountered in the art, the prior art solutions to those problems, and the speed at which innovations are made. I understand that a POSITA is not a specific real individual but rather a hypothetical individual having the qualities reflected by the factors discussed above.

48. The Patents at Issue relate to communication systems such as broadband communications systems / cable systems (*e.g.*, cable TV systems, HFC (Hybrid Fiber Coax) cable

systems, etc.), satellite communication systems, and RF systems, including systems architectures, components, and applications. I note that each of the Patents at Issue relate to these types of systems as I further discuss below. These types of technologies were typically designed by Electrical, Firmware, and Software Engineers that had experience working with these types of communication systems. I have performed such development myself, and I have further worked with and directly managed these types of Engineers in the industry. I am therefore very familiar with the common skill sets required for this type of work.

49. Taking these factors into consideration and based on my experience in the industry at the time of the earliest priority dates of the Patents at Issue, it is my opinion that a POSITA at the time of the earliest possible priority date of each of the Patents at Issue would have been an Engineer with at least a Bachelor's Degree in Electrical Engineering (or equivalent), with at least two years of experience developing broadband/cable TV/satellite communication systems and solutions.

50. I understand Charter's expert Dr. Almeroth has proposed that the level of ordinary skill would be a person having at least i) a bachelor-level degree in electrical engineering or a related subject and three or more years of experience working in the field of cable television signal processing and communication systems; ii) a master's-level degree in electrical engineering or a related subject and one or more years of experience working in the field of cable television signal processing and communication systems; or iii) a Ph.D.-level degree in electrical engineering or a related subject and at least some experience working in the field of cable television signal processing and/or communication systems. *See* Almeroth Decl. ¶ 27.

51. I am qualified to provide opinions concerning what a POSITA would have known and understood at that time, and my analysis and conclusions herein are from the perspective of a POSITA as of that date and would apply under either party's proposed set of qualifications.

52. As of approximately 2003, I was at least as qualified as the POSITA identified above. Thus, I understand the perspective of a POSITA as of at least as early as 2003, the earliest priority date of any of the Patents at Issue.

VII. '775 PATENT

A. Overview of the '775 Patent

53. The '775 Patent is titled "Architecture For A Flexible And High-Performance Gateway Cable Modem," was filed on September 30, 2003, and issued on July 17, 2012. Accordingly, for my analysis herein, I have assumed the date of September 30, 2003 as the earliest possible priority date for the '775 Patent.

54. The '775 Patent is directed towards a novel architecture for cable modems. As the '775 Patent explains "[t]he future gateway cable modem (CM) will provide a wide range of data networking and VoIP service" and "[t]he major challenge in designing such a gateway cable modem is integration of these services with the basic cable modem functionality in an efficient and cost effective [way]." '775 Patent, 1:13–18.

55. The '775 Patent discloses various embodiments providing a "highly flexible, high performance system capable of handling multiple cable modem voice, data and networking services" where a cable modem engine is "completely partitioned" from the data networking engine. *Id.* at 1:61–2:4. In the disclosed embodiments, complete partitioning is accomplished, for example, by "localizing data networking functions in the data networking engine processor and localizing cable modem functions in the cable modem engine processor." *Id.* at 4:16–19.

56. Figure 1 illustrates an exemplary cable modem system architecture 100 according to the '775 Patent. I have annotated Figure 1 below.

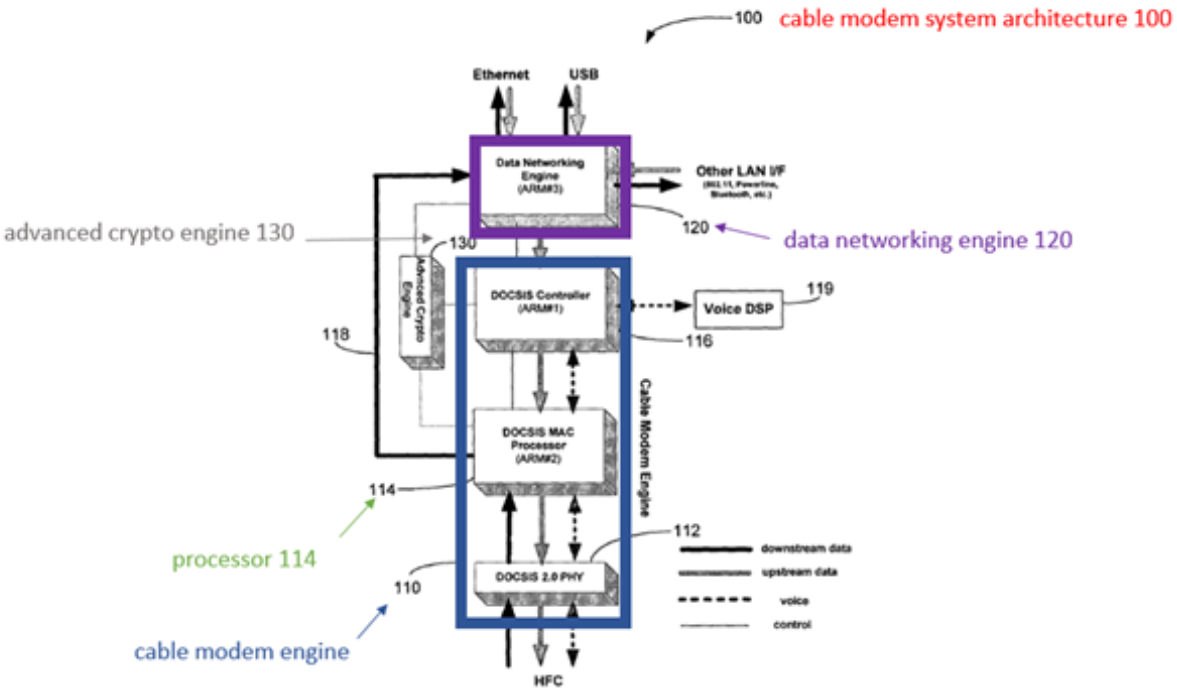


Figure 1

57. System 100 includes three major subsystems: cable modem engine 110, data networking engine 120, and advanced crypto engine 130. *Id.* at 2:49–52. Cable modem engine 110 implements DOCSIS cable modem functions. *Id.* at 2:55–56. The data networking engine 120 implements data networking functions. *Id.* at 3:49–53. "Advanced crypto engine 130 provides hardware support for crypto functions." *Id.* at 4:4–5.

58. In the embodiment of Figure 1, the cable modem engine includes a "processor 114," and the data networking engine also includes a processor such as, for example, an ARM processor. *See id.* at FIG. 1.

59. At least one data bus is implemented at, for example, path 118. This allows communication between the "Data Networking Engine" "120" and the "Cable Modem Engine" "110" while still retaining functional partitioning. *See id*.

B. Summary of The '775 Patent File History

60. I have reviewed the prosecution history leading to the issuance of the '775 Patent. A copy of the file history is attached as Exhibit B.

61. On September 30, 2003, the Applicant filed the application leading to the '775 Patent. The originally filed claims are reproduced below:

1. A cable modem system comprising:

a data networking engine that performs data networking functions; and

a cable modem engine that performs all other cable modem functions; the cable modem engine being completely partitioned from the data networking engine.

2. A cable modem system as claimed in claim 1, wherein all DOCSIS functions are localized in the cable modem engine.

3. A cable modem system as claimed in claim 2, wherein VoIP functionality is embedded in the cable modem engine.

4. A cable modem system as claimed in claim 1, and further comprising an advanced crypto engine that performs all crypto functions.

5. A cable modem system as claimed in claim 1, wherein the cable modem engine comprises:

a DOCSIS PHY layer;

a DOCSIS MAC processor; and

a DOCSIS controller.

6. A cable modem system as claimed in claim 5, wherein the DOCSIS PHY layer comprises a hardware transmitter and receiver.

7. A cable modem system as claimed in claim 5, wherein the DOCSIS MAC processor processes downstream PDU packets and forwards the processed packets directly to the data networking engine without the involvement of the DOCSIS controller in order to boost downstream throughput.

8. A cable modem system as claimed in claim 5, wherein all VoIP functionality is implemented in the DOCSIS controller.

9. A cable modem system as claimed in claim 8, wherein the VoIP functionality is in conformance with the PacketCable specification.

10. A cable modem system as claimed in claim 5, wherein the data networking engine is responsible for all data networking processing including advanced multi-port briding/routing with NAT/firewall and VPN, and home networking applications.

11. A cable modem system as claimed in claim 10, wherein the data networking engine comprises the entire embedded portal services functionality of the CableHome specification.

12. A cable modem architecture comprising:

a cable modem engine comprising:

a DOCSIS PHY layer comprising a transmitter and receiver;

a DOCSIS MAC processor that implements real-time critical MAC functions for both upstream and downstream communications; and

a DOCSIS controller implementing VoIP functionality; and

a data networking engine implementing all data networking processing and home networking applications, wherein the data networking engine is completely decoupled from the cable modem engine.

13. A cable modem architecture as claimed in claim 12, wherein the DOCSIS controller provides VoIP functionality in accordance with the PacketCable specification, and wherein the data networking engine provides the embedded portal services functionality of the CableHome specification, wherein the CableHome functionality is provided by the data networking engine is completely decoupled from the PacketCable and DOCSIS functionality provided by the cable modem engine.

14. A cable modem architecture as claimed in claim 13, wherein the DOCSIS MAC processor is an ARM9TDMI-based RISC processor, and wherein the DOCSIS controller is an ARM940-based RISC processor.

> 15. A method for providing a flexible and partitioned cable modem gateway comprising:
>
> providing data and home networking functionality in a data networking engine;
>
> providing DOCSIS and VoIP functionality in a cable modem engine; and
>
> partitioning the data networking engine from the cable modem engine so that the data and home networking functionality is completely decoupled from the DOCSIS and VoIP functionality.

Exhibit B at ENTROPIC_CHARTER_0005459–0005462.

62. On February 19, 2009, the Examiner issued a non-final rejection. Among other things, the Examiner rejected originally filed Claims 1–15 as being anticipated by Brooks (U.S. Publication No. 2001/0039600). By way of example, at the time, Claim 1 recited the following:

> 1. A cable modem system comprising:
>
> a data networking engine that performs data networking functions; and
>
> a cable modem engine that performs all other cable modem functions; the cable modem engine being completely partitioned from the data networking engine.

Id. at ENTROPIC_CHARTER_0005459.

63. The Examiner asserted:

> As per claim 1, Brooks teaches a cable modem system comprising: a data networking engine that performs data networking functions (Abstract; paragraphs 0013-0016); and a cable modem engine that performs all other cable modem functions (Abstract; paragraphs 0013-0016); the cable modem engine being completely partitioned from the data networking engine (Abstract; paragraphs 0013-0016).

Id. at ENTROPIC_CHARTER_0005497.

64. On May 19, 2009, the Applicant responded to the February 19, 2009 rejection. The Applicant amended the claims, including Claim 1, as shown below.

> 1. (Currently Amended) A cable modem system comprising:
>
> a data networking engine implemented in a first circuit that includes at least one processor, the data networking engine programmed with software that when executed by the at least one processor of the first circuit causes the data networking engine to perform ~~that performs~~ home ~~data~~ networking functions including interfacing with customer provided equipment; ~~and~~
>
> a cable modem engine implemented in a second circuit that includes at least one processor, the second circuit being separate from the first circuit, the cable modem engine programmed with software that when executed by the at least one processor of the second circuit causes the cable mode engine to perform ~~that performs all other~~ cable modem functions other than the home networking functions performed by the data networking engine, the cable modem engine configured to enable upgrades to its software in a manner that is independent of upgrades to the software of the data networking engine; and
>
> a data bus that connects the data networking engine to the cable modem engine,
>
> wherein the cable modem functions performed by the cable modem engine are ~~being~~ completely partitioned from the home networking functions performed by the data networking engine.

Id. at ENTROPIC_CHARTER_0005510.

65. The Applicant also traversed the rejection "because the cited portions of [Brooks] ***do not correspond to aspects of the claimed invention*** *directed to the data networking functions performed by a data networking engine being* ***completely partitioned/decoupled*** *from the other cable modem functions performed by a cable engine*." *Id.* at ENTROPIC_CHARTER_0005514 (emphasis added).

66. The Applicant further explained that the office action created uncertainty as to how the Examiner was interpreting and applying the disclosures of Brooks to the claims at issue. Specifically, the Applicant stated:

> [T]he Office action does not identify what element of [Brooks] is being asserted as ***corresponding to Applicant's data networking engine***.

Id. at ENTROPIC_CHARTER_0005514 (emphasis added).

67. On February 5, 2010, the Examiner issued a final rejection. Among other things, the Examiner again issued a rejection of the claims as anticipated by Brooks. The Examiner stated the following with respect to Claim 1:

> As per claim 1, Brooks teaches a cable modem system comprising: a data networking engine implemented in a first circuit that includes at least one processor (Figure 2), the data networking engine programmed with software that when executed by the at least one processor of the first circuit causes the data networking engine to perform home networking functions including interfacing with customer provided equipment (Abstract; paragraphs 0014, 0026, 0037, 0066-0068); a cable modem engine implemented in a second circuit that includes at least one processor, the second circuit being separate from the first circuit, the cable modem engine programmed with software that when executed by the at least one processor of the second circuit causes the cable modem engine to perform cable modem functions other than the home networking functions performed by the data networking engine, the cable modem engine configured to enable upgrades to its software in a manner that is independent of upgrades to the software of the data networking engine (paragraphs 0026, 0037, 0042-0046, 0050-0052); a data bus that connects the data networking engine to the cable modem engine, wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine (0042-0046).

Id. at ENTROPIC_CHARTER_0005540.

68. The Examiner also provided the following response to the Applicant's remarks:

> The data networking engine and cable modem engines are represented in figures 1 and 2 of the Brooks reference, including buses carrying out separate networking functions. For example, the data networking engine interfaces with the peripheral devices and employs operating system functions, and the cable modem engine implements DOCSIS functionality. These entities are completely partitioned from each other, as discussed in the cited sections.
>
> Paragraphs 0036-0042 discuss the transfer of packets between the cable modem and data networking engines. Therefore, examiner respectfully disagrees with the assertion that there is no data networking engine, and it is respectfully submitted that the Brooks invention fully teaches the limitations of claim 7. Further, paragraph 0010 discusses the inclusion of various CableLabs standards. Because PacketCable and CableHome specifications constitute these standards, Brooks fully teaches the claim limitations.

Id. at ENTROPIC_CHARTER_0005544.

69. On April 5, 2010, the Applicant responded to the February 5 office action. The Applicant again traversed the rejection and explained the Applicant's continued uncertainty as to how the Examiner was interpreting and applying the disclosures of Brooks to the claims at issue. Specifically, the Applicant stated the following:

> For example, ***Applicant is uncertain how [Brooks] discloses aspects of the claimed invention directed to data networking functions performed by a data networking engine being completely partitioned/decoupled from the other cable modem functions performed by a cable modem engine***. The Examiner has repeatedly failed to identify elements of [Brooks] corresponding to these aspects as requested. In contrast, the Office Action make the conclusion statement [sic] that "the data networking engine and the cable modem engines are represented in Figures 1 and 2 of [Brooks]" (*see, e.g.*, p. 8 of the Office action). However, Applicant is uncertain how any reasonable interpretation of these Figures can provide correspondence. For example, ***Figure 2 of [Brooks] discloses only two processors, each of which, therefore, must correspond to the claimed data-networking and cable-modem engines. However, the discussion of Figure 2 makes clear that the cable modem functions are performed by CMAC unit 224*** (*see, e.g.*, paragraph 0042). Therefore, in order for the cable modem engine to contain a processor and perform the CMAC functions as claimed, the cited cable modem engine must include circuitry to connect the processors with the CMAC unit. Because available connecting circuitry would be shared with the other processor, Applicant is uncertain how the asserted

> cable modem engine and home networking engine can be completely partitioned as claimed. Because the Office Action has not identified these clamed aspects in [Brooks], a *prime facie* case has not been presented and Applicant requests that the rejection of claims 1-16 be withdrawn.

Id. at ENTROPIC_CHARTER_0005557–0005558 (emphasis added).

70. The Applicant further confirmed its uncertainty of the Examiner's application of Brooks by stating, for example: "Applicant submits that the Examiner's failure to identify corresponding elements as requested in Applicant's response constitutes an incomplete answer under M.P.E.P. § 707.07 and, therefore, makes the finality of the Office Action improper." *Id.* at ENTROPIC_CHARTER_0005558. The Applicant further explained, "[i]n order to comply with 35 U.S.C. § 132, sufficient detail must be provided by the Examiner regarding the alleged correspondence between the claimed invention and the cited reference to enable Applicant to adequately respond to the rejections." *Id*.

71. On May 11, 2010, the Examiner issued an Advisory Action, in which the Examiner withdrew some rejections but continued the finality of the rejection of Claims 1–16 associated with the Brooks '006 disclosure. The Examiner explained the following:

> Brooks' abstract, for example, discloses bifurcated processing architecture. The first processor processes information flowing to and from cable media interface circuitry. This constitutes the data networking engine, which performs the interacting with equipment as claimed. The second processor performs the management of some message processing and scheduling, which constitutes cable modem functions other than those of the data networking engine (please see paragraph 0026). This then constitutes the cable modem engine, as claimed. Claim 9 of the Brooks reference further teaches partitioned processors, where the co-processor supports the processing of cable media and performs data transfer, and the first processor performs a plurality of other processing functions.

Id. at ENTROPIC_CHARTER_0005572.

72. On June 7, 2010, the Applicant submitted a request for continued examination along with an amendment to the claims and remarks. Among other things, the Applicant explained its continued requests for the Examiner to explain the application of the Brooks reference because

"it was pointed out that there was continued uncertainty as to how the Examiner was interpreting and applying the disclosures of Brooks '600 to the claims at issue." *Id.* at ENTROPIC_CHARTER_0005580. In particular, the Applicant explained the continued uncertainty as follows:

> [I]t was pointed out that in Brooks '600, only two processors were disclosed. Therefore, from the Examiner's position that "the data networking engine and cable modem engines are represented in figures 1 and 2" (Office Action, p. 8), it would follow that one of the two processors corresponded to the networking engine, and the other of the two processors corresponded to the cable modem engine. ***It was further pointed out that while the discussion concerning Figure 2 in Brooks '600 paragraph 0042 makes clear that cable modem functions are performed by CMAC unit 224***, if the cable modem engine is to contain a processor and perform CMAC functions as claimed, the cited cable modem engine must include circuitry to connect one of the processors with the CMAC unit. It was noted, however, that because available connecting circuitry would be shared by both the one processor and the other processor, the asserted cable modem engine and home networking engine could not be completely partitioned as claimed.

Id. at ENTROPIC_CHARTER_0005580–0005581 (emphasis added).

73. In other words, as the Applicant explained, processor 102, which the Examiner had designated as the data networking engine, handles many cable modem functions:

> [I]t appears that the Examiner may be asserting that the cable modem processor includes second processor 104, that the data networking engine is first processor 102 (see Fig. 2), and that the CMAC/CPHY block (114, 118, 224 and 228) is also a part of the cable modem engine. However, processor 102 handles many cable modem functions (see Fig. 4, paragraphs 0053 to 0062), and is explicitly described as "programmed to implement the desired MAC functionality" (paragraph 0026). Paragraph 0025 states "in the case of DOCSIS, typical MAC functionality includes MPEG and MCNS decoding and frame synchronization." On the other hand, processor 104 is described only as providing operating system support and that it "<u>may</u> manage some message processing and scheduling" (paragraph 0026, emphasis added). Thus, the Examiner's designation of the first processor as the "data networking engine" is at odds with the Brooks '600 description of processor 102 as being "programmed to implement the desired MAC functionality."

Id. at ENTROPIC_CHARTER_0005582 (emphasis in original).

74. The Applicant further explained that the specific architecture of Brooks, in which the CMAC/CPHY block (114, 118, 224, and 228) communicates with both processors 102 and

104 by sharing the same data paths and sharing the same direct memory access controller, did not "square" with certain features in Claim 1 and Claim 15:

> The Examiner's apparent designation of the first processor 102 in Brooks '600 as the "data networking engine," and the second processor 104 and the CMAC/CPHY block (114, 118, 224 and 228) as the "cable modem engine," further does not square with the claim 1 feature that "the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine," and the claim 15 feature of "partitioning the data networking engine from the cable modem engine so that the data and home networking functionality is completely decoupled from the DOCSIS and VOIP functionality." This is because the CMAC/CPHY block (114, 118, 224 and 228) communicates with both the processors 102 and 104 by sharing the same data paths and sharing the same direct memory access controller. (See peripheral bus 112 – bridge 110 – system bus 108 in Fig. 1 and APB 214 – DMA Controller/ASB-APB Bridge 212 – ASB 210 in Fig. 2, and paragraphs 0034 and 0035.)

Id. at ENTROPIC_CHARTER_0005582.

75. On September 2, 2011, the Examiner issued a non-final rejection for Claims 1–16. The Examiner did not include Brooks as a basis for the rejection. *See id.* at ENTROPIC_CHARTER_0005592–0005602.

76. On March 2, 2012, the Applicant amended the claims and added the now-asserted Claim 18 (as Claim 20). Claim 20 is reproduced below:

20. (**New**) A cable modem system comprising:

a data networking engine implemented in a first circuit that includes at least one processor, the data networking engine programmed with software that when executed by the at least one processor of the first circuit causes the data networking engine to perform home networking functions including interfacing with customer provided equipment;

a cable modem engine implemented in a second circuit that includes at least one processor, the second circuit being separate from the first circuit, the cable modem engine programmed with software that when executed by the at least one processor of the second circuit causes the cable modem engine to perform cable modem functions other than the home networking functions performed by the data networking engine, the cable modem functions including interfacing with cable media, and the cable modem engine configured to enable upgrades to its software in a manner that is independent of upgrades to the software of the data networking engine, the cable modem engine including a DOCSIS controller and a DOCSIS MAC processor, the DOCSIS MAC processor configured to process downstream PDU packets and forward the processed packets directly to the data networking engine without the involvement of the DOCSIS controller in order to boost downstream throughput; and

a data bus that connects the data networking engine to the cable modem engine, wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine.

Id. at ENTROPIC_CHARTER_0005619.

77. On March 19, 2012, the Examiner allowed the claims. *See id.* at ENTROPIC_CHARTER_0005628–0005632. Claim 20 was unchanged and issued as Claim 18.

C. Disputed Terms of the '775 Patent

78. I understand that there is a dispute over five (5) claim terms within Claim 18 of the '775 Patent. Below I have reproduced Claim 18 of the '775 Patent in its entirety and have emphasized the terms that are in dispute.

18. A cable modem system comprising:

a data networking engine implemented in a first circuit that includes at least one processor, the data networking engine programmed with software that when

executed by the at least one processor of the first circuit causes the data networking engine to perform home networking functions including interfacing with customer provided equipment;

a cable modem engine implemented in a second circuit that includes at least one processor, the second circuit being separate from the first circuit, the cable modem engine programmed with software that when executed by the at least one processor of the second circuit causes the cable modem engine to perform cable modem functions other than the home networking functions performed by the data networking engine, the cable modem functions including interfacing with cable media, and the cable modem engine configured to enable upgrades to its software in a manner that is independent of upgrades to the software of the data networking engine, the cable modem engine including a ***DOCSIS controller*** and a ***DOCSIS MAC processor***, the ***DOCSIS MAC processor*** configured to process downstream PDU packets and forward the processed packets directly to the data networking engine without the involvement of the ***DOCSIS controller*** in order to boost downstream throughput; and

a ***data bus*** that connects the data networking engine to the cable modem engine, wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine.

'775 Patent, Claim 18.

79. Dr. Almeroth concludes that these terms are indefinite;[2] however, his analysis is flawed on numerous levels. For the reasons I outline below, a POSITA would not interpret the claims as Dr. Almeroth does and would not find Claim 18 indefinite.

1. "a data networking engine implemented in a first circuit . . ." and "a cable modem engine implemented in a second circuit . . ." (Claim 18)

a. Among other things, Dr. Almeroth's opinions assume a POSITA would ignore "circuit" as used in the plain claim language

80. I understand that the dispute centers around the following claim language:[3]

[2] Including "indefinite" for claim terms "DOCSIS MAC processor" and "DOCSIS controller" if not interpreted as Dr. Almeroth requires (*i.e.,* "[i]f … does not mean …"). Almeroth Decl. ¶ 29.

[3] I note that I have done my analysis considering not only the below claim language but also the claim terms as a whole and Claim 18 as a whole.

- "a data networking engine implemented in a first circuit that includes at least one processor" (Claim 18)
- "a cable modem engine implemented in a second circuit that includes at least one processor, the second circuit being separate from the first circuit" (Claim 18)

81. Dr. Almeroth opines that these terms are ambiguous because:

> [T]here is no way to determine what "circuit" means in the claims or how many circuits a particular cable modem contains. Nor is there a way to determine where one circuit begins and another ends. It is therefore impossible to determine if any particular cable modem contains "a first circuit" and "a second circuit' as claimed, or if the "second circuit" is "separate from the first circuit."

Almeroth Decl. ¶ 29; *see also id.* at ¶¶ 64–75.

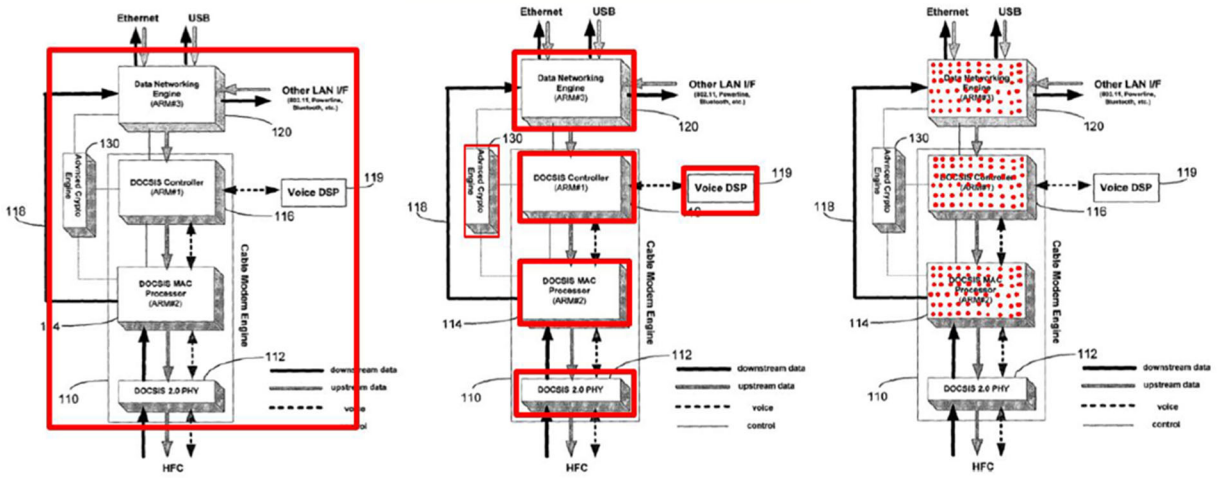
82. I disagree. The '775 Patent does not claim a first and second "circuit" in a vacuum. Rather, Claim 18 recites "a data networking engine implemented in a first circuit that includes at least one processor" and "a cable modem engine implemented in a second circuit that includes at least one processor, the second circuit being separate from the first circuit."

83. A POSITA has no difficulty understanding that circuits, such as those of the data networking engine, are delineated from other circuits, such as those of the cable modem engine. This is extremely common. The definition of "circuit" Dr. Almeroth cites confirms this point: "circuit" "A combination of electrical components interconnected to perform a particular task. At one level a computer consists of a single circuit; at another, it consists of hundreds of interconnected circuits." Almeroth Decl. ¶ 65 (citing Appx. C, at 99).

84. This is further true of the specific context of the '775 Patent. As of the priority date, a POSITA would have been familiar with systems-on-a-chip (SoCs) and application-specific integrated circuits (ASICs) (*i.e.,* a "chip"). *See*, *e.g.*, '775 Patent, 4:58–62. Furthermore, a POSITA would have been familiar with data networking functions (*e.g.*, web server, CableHome, etc.) and cable modem functions (*e.g.*, DOCSIS). *See, e.g., id.* at Abstract. Therefore, a POSITA would

readily appreciate that Claim 18 claims separate data networking and cable modem engines, wherein each is implemented on a circuit that includes at least one processor.

85. Dr. Almeroth attempts to create ambiguity by looking at circuits in the abstract while ignoring the plain language of Claim 18, the specification, and the embodiments depicted in Figures 1 and 2. Dr. Almeroth draws boxes around the physical parts depicted in Figure 1:



Almeroth Decl. ¶¶ 67, 69, 71.

86. Dr. Almeroth concludes that the claim is indefinite because none of the above illustrations show "[a] data networking engine implemented in a first circuit [and] a cable modem engine implemented in a second circuit." *See id.* at ¶¶ 67–72.

87. Dr. Almeroth's physical boxes ignore that the specification describes these components as the portions of physical circuits that embody the functionalities of the cable modem shown:

> System 100 comprises three major ***subsystems***: ***cable modem engine 110; data networking engine 120***; and advanced crypto engine 130. The ***functional sub-components*** of these three-subsystems are illustrated in greater detail in FIG. 2.

'775 Patent, 2: 50–54 (emphasis added).

88. This is consistent with Dr. Almeroth's dictionary definition, which speaks in terms of division based on function: "[a] combination of electrical components interconnected to perform

a particular task." Almeroth Decl. ¶ 65 (citing Appx. C at 99). A POSITA would have recognized at the time, as I experienced firsthand, the combination of electrical components interconnected to perform a particular task included integrated circuits, wherein an SoC comprised one or more integrated circuits. *See*'775 Patent, 4:25–28; *see also id*. at 4:58–62.

89. The specification provides an exemplary embodiment where the data networking engine and cable modem engine may be implemented on a single chip having two processors, *i.e.*, one for the data networking engine and one for the cable modem engine. *See* '775 Patent, 4:58–62 ("***A chip*** implementing cable modem system 100 will have only a small incremental hardware cost/functional increase over current stand-alone cable modem chips. The major cost difference relative to current chips is the addition of another ARM940-type processor to the chip."). In such an embodiment, the cable modem engine and data networking engine would be implemented on the same circuit board (if not the same die).

90. A POSITA would therefore not discard their prior experience and plain understanding of separate circuits where the separation is in terms of function. Thus, a POSITA would not understand "separate" to mean "separate circuit boards."

2. "DOCSIS MAC processor" / "DOCSIS controller" (Claim 18)

a. A POSITA would understand the meaning of "DOCSIS MAC processor" and "DOCSIS controller"

91. Dr. Almeroth opines that the term DOCSIS MAC processor must mean "the DOCSIS MAC processor as described in the patent specification (*see, e.g.*, '775 Patent, 3:1–20; 4:41–54; *id.* at Figures 1 & 2)." Almeroth Decl. ¶ 29; *see also id.* ¶¶ 76–77. Dr. Almeroth also opines that the term DOCSIS controller must "mean the DOCSIS controller as described in the patent specification (*see, e.g.*, '775 Patent, 3:21–48; 4:41–57; *id.* at Figures 1 & 2)." Almeroth

Decl. ¶ 29. According to Dr. Almeroth, this is because these terms do not have a plain and ordinary meaning to a POSITA. Almeroth Decl. ¶¶ 76–77.

92. I disagree. Consistent with the plain meaning of the terms, a POSITA reading the claims and specification would understand that the DOCSIS MAC processor and the DOCSIS controller are portions of the cable modem engine corresponding to the functions of MAC processing for DOCSIS, and controlling the DOCSIS functions, respectively. '775 Patent, 2:55–59; *see also* ¶¶ 57, 87, *supra*.

93. This plain understanding is confirmed by the specification, which describes these blocks and their corresponding functions in detail. For example, "DOCSIS MAC processor" 114 "implements real-time critical MAC functions for both upstream (US) and downstream (DS) communications." '775 Patent, 3:1–3. These MAC functions can include "US and DS synchronization, DS MAC address filtering, DS protocol filtering, US and DS PHS, concatenation, fragmentation, MAP processing, US transmission scheduling, as well as DOCSIS link-layer DES encryption and decryption." *Id.* at 3:3–7. Similarly, the specification describes how "DOCSIS controller" 116 implements DOCSIS functions such as MAC management message (MMM) processing, IGMP, MAC address learning, classification, US protocol filtering, CM IP stack and software downloading, cable modem IP/UDP functions, SNMP, DHCP, TFTP, and TOD functionality, and cable modem provisioning. '775 Patent, 3:27–38.

b. Dr. Almeroth misconstrues "DOCSIS MAC processor" and "DOCSIS controller" by requiring them to be implemented on separate, specific physical processors

94. Dr. Almeroth opines that Claim 18 is indefinite because the cable modem engine is implemented in a circuit "that includes at least one processor." Almeroth Decl. ¶ 78. Specifically, he opines:

> [T]his would cover a cable modem engine that includes only one processor. However, the claim also expressly requires that the cable modem engine contain a DOCSIS MAC processor and a DOCSIS controller, both of which are ARM processors.

Almeroth Decl. ¶ 78 (parentheticals omitted).

95. In my opinion there are two errors here. First, Dr. Almeroth misinterprets "DOCSIS MAC processor" and "DOCSIS controller" as being physical processors with some physical separateness. Second, Dr. Almeroth contends that they must be the specific brand/architecture of physical processors (ARM processors) identified as exemplary in the specification. A POSITA would find no support for any of these contentions.

96. There is an *exemplary* embodiment depicted in Figure 1 where "the processing-intensive functions of the cable modem and data networking are rationally distributed among three different [physical] processors." '775 Patent, 4:43–49. In this exemplary embodiment, there are two different physical processors in the cable modem engine, and the "DOCSIS MAC processor" functionality is assigned to one processor core while the "DOCSIS controller" functionality is assigned to the second processor core. But in another example embodiment, Claim 18 does not require that the functions of the "DOCSIS MAC processor" and the "DOCSIS controller" be embodied or implemented in separate physical processors. *See id.* at 4:16–19 ("This is accomplished by localizing data networking functions in the data networking engine processor [singular] and localizing cable modem functions in the cable modem engine processor [singular]") (annotation added). Thus, Claim 18 simply requires that the cable modem engine "includes at least ***one*** processor."

97. Moreover, a POSITA would find Dr. Almeroth's interpretation inconsistent with other description in the specification. The '775 Patent discloses that "A chip implementing cable modem system 100 will have only a small incremental hardware cost/functional increase over

current stand-alone cable modem chips. The major cost difference relative to current chips is the addition of ***another ARM940-type processor to the chip***." *Id.* at 4:58–62 (emphasis added). That means the cable modem engine itself may be implemented on a single processor core (the data networking engine embodied in the other). In fact, the '775 Patent clearly states "[t]his is accomplished by localizing data networking functions in the ***data networking engine processor*** [singular] and localizing cable modem functions in the ***cable modem engine processor*** [singular]". *See id.* at 4:16–19 (annotation and emphasis added). This is consistent with the claim language for the "cable modem engine [] second circuit" requiring "at least ***one***" processor (the "data networking engine [] first circuit" requiring the other). In light of this disclosure, a POSITA would not conclude that the claimed "DOCSIS MAC processor" and "DOCSIS controller" must be implemented on separate processors.

98. A POSITA would further understand that, although ARM processors are common processors, there are many other types of processors that were readily available at the time of the invention and there would be no reason to exclude other kinds of processors from the scope of the claims. The specification similarly makes this clear by explaining that Figure 1 is a non-limiting "embodiment." *See* '775 Patent, 3:17–19 ("***In one implementation***, processor 114 is an ARM9TDMI-based RISC processor") (emphasis added); 3:24–25 ("***In one implementation***, controller 116 is an ARM940-based RISC processor") (emphasis added).

99. Thus, in my opinion, a POSITA would be able to ascertain the scope of Claim 18 with reasonable certainty and would not misinterpret the "DOCSIS MAC processor" and "DOCSIS controller" functional blocks as limited to separate, specific physical processors.

3. "data bus" (Claim 18)

100. Dr. Almeroth opines that "data bus" is indefinite because of a purported disclaimer during prosecution of the '775 Patent related to the scope of the term "completely partitioned." Specifically, he states:

> The claim limitation requiring "a data bus that connects the data networking engine to the cable modem engine, wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine" renders Claim 18 and its dependents indefinite. The applicants successfully argued during prosecution that a "data networking engine" and a "cable modem engine" are not "completely partitioned" if they share "connecting circuitry" or "data paths." The "data bus" as claimed would be shared "connecting circuitry" and a shared "data path," meaning the cable modem engine and the data networking engine cannot be "completely partitioned" as claimed.

Almeroth Decl. ¶ 29; *see also* ¶ 79.

101. I disagree. Both terms "data bus" and "completely partitioned" appear in the '775 Patent claims, including Claim 18, and, as a result, no POSITA would consider there to be a disclaimer in the scope of the term "completely partitioned" to exclude a data bus. In addition, the Examiner understood the claim scope during prosecution and did not find a "data bus" incompatible with "completely partitioned."

102. A POSITA would *not* understand that the presence of a data bus between the data networking engine and the cable modem engine destroys their separate nature. *See, e.g.,* ¶¶ 82–84, 89, 90, *supra*. The '775 Patent confirms the standard understanding of a POSITA that two processors with complete separation of their functions remain completely separated even with a data bus in between allowing information exchange. *See, e.g.,* ¶¶ 82–84, 89, 90, *supra*; *see also*, '775 Patent, Fig 1, 3:14–17, 3:22–24.

103. Moreover, during prosecution, the Applicant never limited "completely partitioned" to exclude "any circuitry" or any shared "data path" as Dr. Almeroth asserts. *See*

Almeroth Decl. ¶¶ 57–63; *see also* ¶ 79. There is no redefinition or disclaimer and Dr. Almeroth has not identified any.

104. If one accepted Dr. Almeroth's incorrect analysis regarding disclaimer, then the requirements that Claim 18 have "a data networking engine implemented in a first circuit that includes at least one processor . . .;" "a cable modem engine implemented in a second circuit that includes at least one processor, the second circuit being separate from the first circuit . . .;" and "a data bus that connects the data networking engine to the cable modem engine, wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine," would seem to result in zero claim scope—if I understand what Dr. Almeroth is proposing. In other words, there could be no device that meets the elements of claim 18. This seems very unlikely to be the view of any POSITA.

105. It appears Dr. Almeroth reaches this conclusion based on a misunderstanding of the statements the Applicant made with respect to Brooks. The first time the Applicant addressed Brooks (in the May 19, 2009 office action response), the Applicant expressly stated that the "Office action does not identify what element of [Brooks] is being asserted as corresponding to Applicant's data networking engine," (Exhibit B at ENTROPIC_CHARTER_0005514) and continued to make this point when the Applicant was discussing Brooks.

106. Brooks discloses two programmable physical processors, 102 and 104, but as the Applicant pointed out, the functionality of these processors is ***not partitioned*** as required by the claims. Applicant reiterated this same problem throughout the dialogue with the Examiner concerning Brooks, specifically explaining that there is not a "data networking engine" in Brooks because processor 102 handles many cable modem functions, and processor 104 is described only

as providing operational system support and "may manage some message processing and scheduling." Exhibit B at ENTROPIC_CHARTER_0005582 (emphasis in original).

107. During prosecution, Applicant attempted to understand how the Examiner was attempting to map Brooks onto the claims. In this discussion, the Applicant again reiterated that Brooks ***does not disclose the claimed partitioning*** of the cable modem engine and data networking engine.

108. To properly frame the discussion, I first observe that a third component of Brooks was discussed, called the "CMAC/CPHY" component 224. As the Applicant explained in the April 5, 2010 office action response, "Figure 2 [of Brooks] makes clear that the cable modem functions are performed by CMAC unit 224 (*see, e.g.*, paragraph 0042)." *Id.* at ENTROPIC_CHARTER_0005557. I have included an annotated version of Brooks Figure 2 below, showing the CMAC unit and processors 102 and 104:

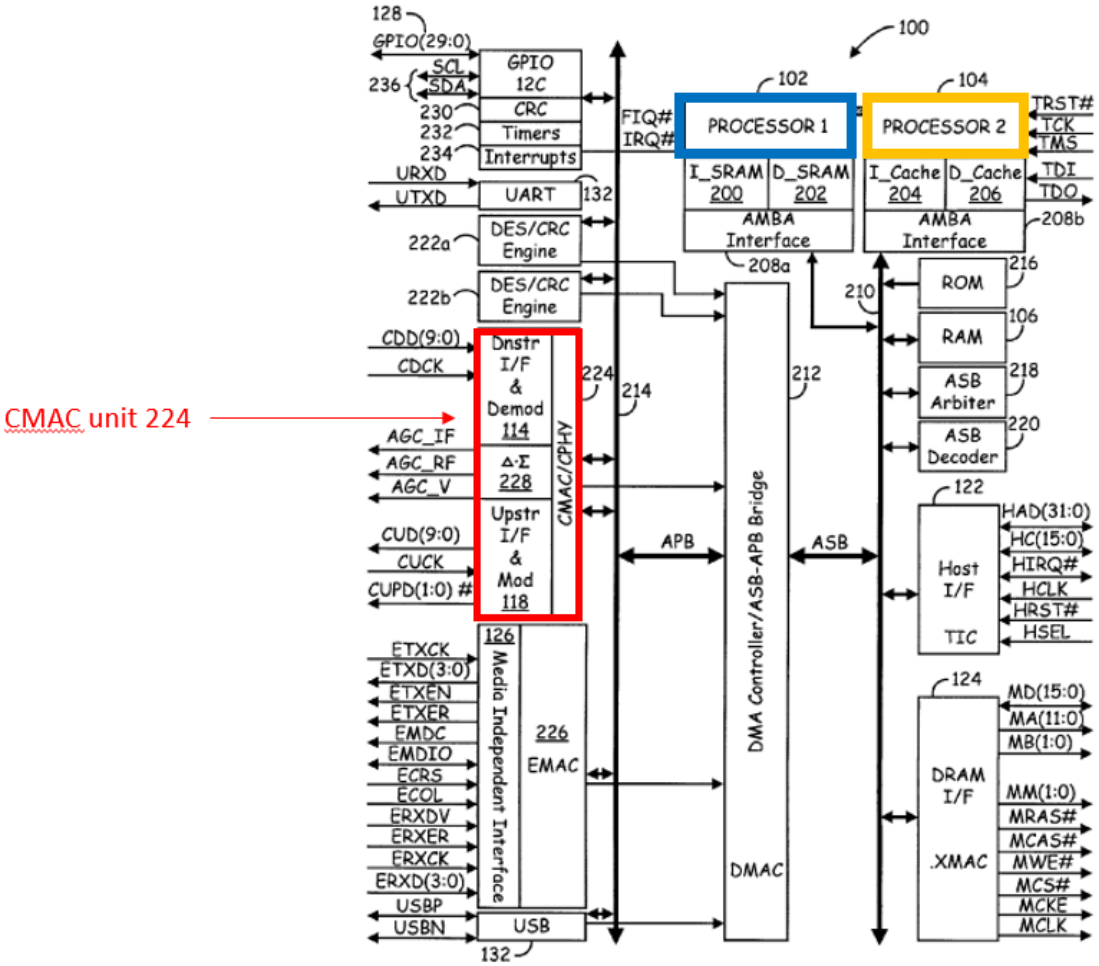


Fig. 2

Exhibit C, U.S. Pub. No. 2001/0039600 ("Brooks"), FIG. 2.

109. Applicant elaborated that CMAC 224 is responsible for, at least in part, the cable modem functions:

> [T]he Office Action make the conclusion statement [sic] that "the data networking engine and the cable modem engines are represented in Figure 1 and 2 of the [Brooks]" (*see, e.g.,* p. 8 of the Office action). However, Applicant is uncertain how any reasonable interpretation of these Figures can provide correspondence. For example, ***Figure 2 of [Brooks] discloses only two processors, each of which, therefore, must correspond to the claimed data-networking and cable-modem engines. However, the discussion of Figure 2 makes clear that the cable modem functions are performed by CMAC unit 224*** (*see, e.g.*, paragraph 0042). Therefore, in order for the cable modem engine to contain a processor and perform the CMAC functions as claimed, the cited cable modem engine must include circuitry to connect the processors with the CMAC unit. Because available connecting circuitry

> would be shared with the other processor, Applicant is uncertain how the asserted cable modem entire and home networking engine can be completely partitioned as claimed.

Exhibit B at ENTROPIC_CHARTER_0005557–0005558 (emphasis added); *see also* Exhibit C, [0042] ("a cable media access controller (CMAC) 224, including a System timer and interfaces to the cable downstream PHY circuitry 114 and cable upstream PHY circuitry 118, is provided to Support communications with a cable media 134").

110. The Applicant explained it was "uncertain how the asserted cable modem engine and home networking engine can be completely partitioned" because it appeared that the Examiner's assertion of Brooks would not make sense unless the Examiner was considering the "cable modem engine" to include ***one*** of the processors (102 or 104)—but ***not the other—plus the CMAC unit 224*** and the "available connecting circuitry [] shared with the other processor." Exhibit B at ENTROPIC_CHARTER_0005557–0005558.

111. However, the Applicant explained that in Brooks there is no indication that one processor and not the other would be a "completely partitioned" cable modem engine or data networking engine. *See id.* ("Because available connecting circuitry would be shared with the other processor, Applicant is uncertain how the asserted cable modem entire and home networking engine can be completely partitioned as claimed"). In other words, the Applicant was uncertain about how the Examiner was applying Brooks because there was no more of a reason to draw a box around the CMAC and processor 1 than there was to draw a box around the CMAC and processor 2, due to the specific layout of Brooks Figure 2.

112. In summary, Applicant's statements concerning Brooks focus on the point that there is no disclosure of ***partitioned*** engines (data networking and cable modem), with programmable processors. Everything from the file history that Dr. Almeroth focuses on simply reiterates this point in various ways. A POSITA would not understand the Applicant's statements

regarding Brooks to be a disclaimer of a data bus or other connection between the data networking engine and cable modem engine.

113. I also note an important point overlooked by Dr. Almeroth's position. The Applicant did not make any representations disclaiming a connection between the processors of a data networking engine and a cable modem engine because that connection in Brooks was not the subject of Applicant's statements.

114. The processors 102 and 104 of Brooks are connected directly, by a "system bus 108," in Figure 1, also known as "Advanced System Bus (ASB 210)" in Figure 2, highlighted below:

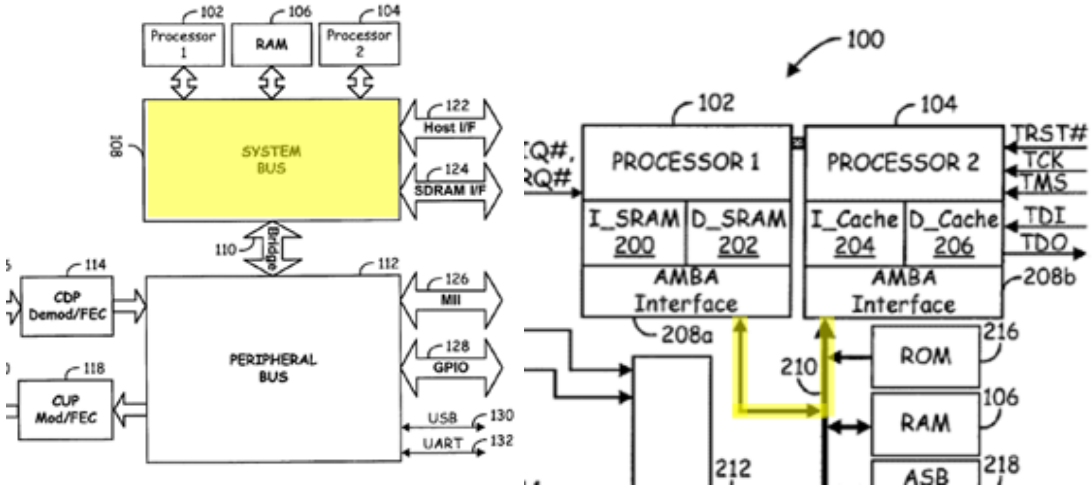


Exhibit C, FIGs. 1–2 (excerpt, annotated); *see also id.* at [0027] ("the first and second processors 102 and 104, are communicatively coupled to a system bus 108."), [0032] ("Advanced System Bus (ASB 210)"), [0034] ("The ASB210 is the bus on which the first and second processors 102 and 104, RAM memory 106, and other direct memory access (DMA) devices reside."). This connection was not referenced in the discussion with the Examiner that Dr. Almeroth relies upon.

115. What was referenced is a different connection. The Applicant pointed the Examiner to the connections between (1) each processor 102/104 and (2) a third component, *i.e.*, the CMAC

unit—***not*** the connection between processors 102 and 104 ***to each other***. Dr. Almeroth's annotation of Figure 2 illustrates the point. Dr. Almeroth highlights the shared connection between each of the two processors on the one hand, and the CMAC on the other (shown in yellow in Almeroth Decl. ¶ 62). But Dr. Almeroth does not highlight the direct connection between the processors—because that point is not the subject of the file history discussion.

116. To summarize, the issue of whether or not there can be a data path between the processor of a data networking engine and the processor of a cable modem engine was not at issue in the '775 Patent file history. A POSITA would not interpret Applicant's discussion of shared "connecting circuitry" or "data paths" as having been related to all "connecting circuitry" or "data paths," as Dr. Almeroth suggests, because clearly the Applicant and the Examiner knew that there was a connection between the processors.

117. Based on the above analysis, it is clear to me that the Applicant's statements regarding Brooks during the prosecution of the '775 Patent do not amount to any disavowal of claim scope, nor did the Applicant interpret the claims in any way that is inconsistent with the plain and ordinary meanings. Because Dr. Almeroth's opinion concerning indefiniteness relies on his misinterpretation of the prosecution history, it is my opinion that he has not shown any ambiguity in the claims scope.

118. A POSITA would be able to ascertain the scope of Claim 18 with reasonable certainty. A POSITA would understand that there is no ambiguity or conflict in having a "data bus that connects the data networking engine to the cable modem engine, wherein the cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine" as claimed in Claim 18 of the '775 Patent.

VIII. '690 PATENT

A. Overview of the '690 Patent

119. The '690 Patent is titled "Receiver Determined Probe" and was filed on December 10, 2009, and issued on October 9, 2012. The '690 Patent claims priority to U.S. Provisional Application No. 61/122,687 dated December 15, 2008, and U.S. Provisional Application No. 61/179,454 filed on May 19, 2009. Accordingly, for my analysis herein, I have assumed the date of December 15, 2008 as the earliest possible priority date for the '690 Patent.

120. The '690 Patent is directed at aiding in the diagnosis of "*problems with subscriber services*." '690 Patent, 1:31–34 (emphasis added). The '690 Patent explains that there has been an "increase in the number of services and devices" offered through home networks which "increases the complexity of coordinating communication between the network nodes as each node may experience different access conditions along its portion of the network." *Id.* at 1:25–29. "This increase in complexity, further increases the likelihood that network problems may develop," and the content providers typically must "send[] a technician to the physical location of the home network to personally assess the network and diagnose the problem." *Id.* at 1:30–36. "[A]s the number of homes with subscriber services incorporated into their home networks increases, so does the amount of resources a service provider must devote to technical support and network maintenance." *Id.* at 36–40.

121. To help aid in the diagnosis of "problems with subscriber services" (*id.* at 1:31–34), the '690 Patent describes the use of probes to "characterize the communication channel over which data is to be sent between nodes in a network," including "various embodiments" in which "nodes on a network are programmed to generate a probe transmission in response to a request from the node that will be receiving the probe." *Id.* at Abstract, 1:41–43.

122. Exemplary "nodes" in a network are illustrated in Figure 1 of the '690 Patent, which I have annotated below. As shown below, these include nodes at the residence 101, as well as a Service Provider network node 112. *Id.* at FIG. 1, 4:10–24.

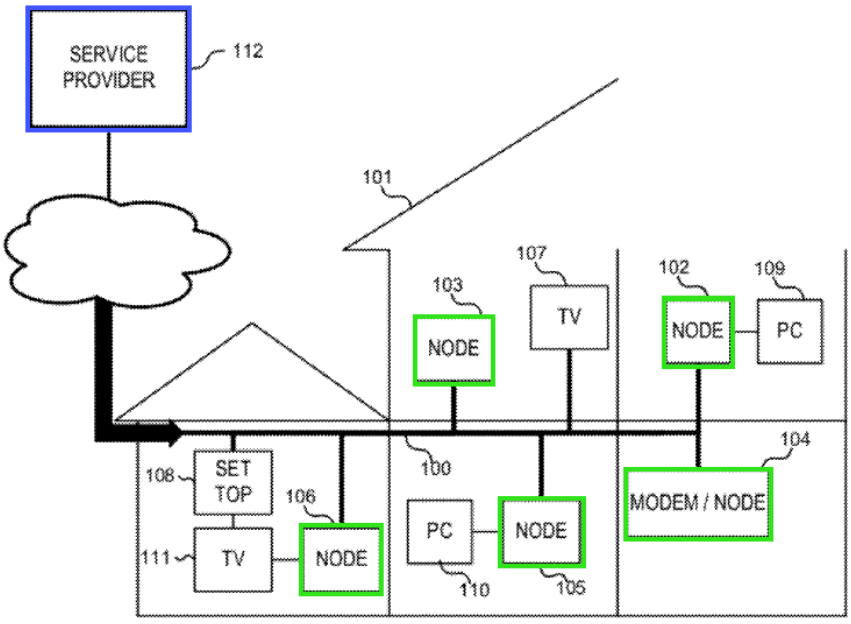


Fig. 1

'690 Patent, FIG. 1 (annotated).

123. According to various embodiments, nodes are "programmed to generate a probe transmission in response to a request from the nodes that will be receiving the probe." *Id.* at 1:66–2:3. The responsive "receiver determined probe" (also called simply a "probe") may comprise one or more of a plurality of parameters used for channel assessment, maintenance procedures, and/or off-site network diagnosis. *See id.* at 1:50–51, 4:25–27. *See also id.* at 2:20–27. An exemplary embodiment is shown in Figure 4, reproduced below.

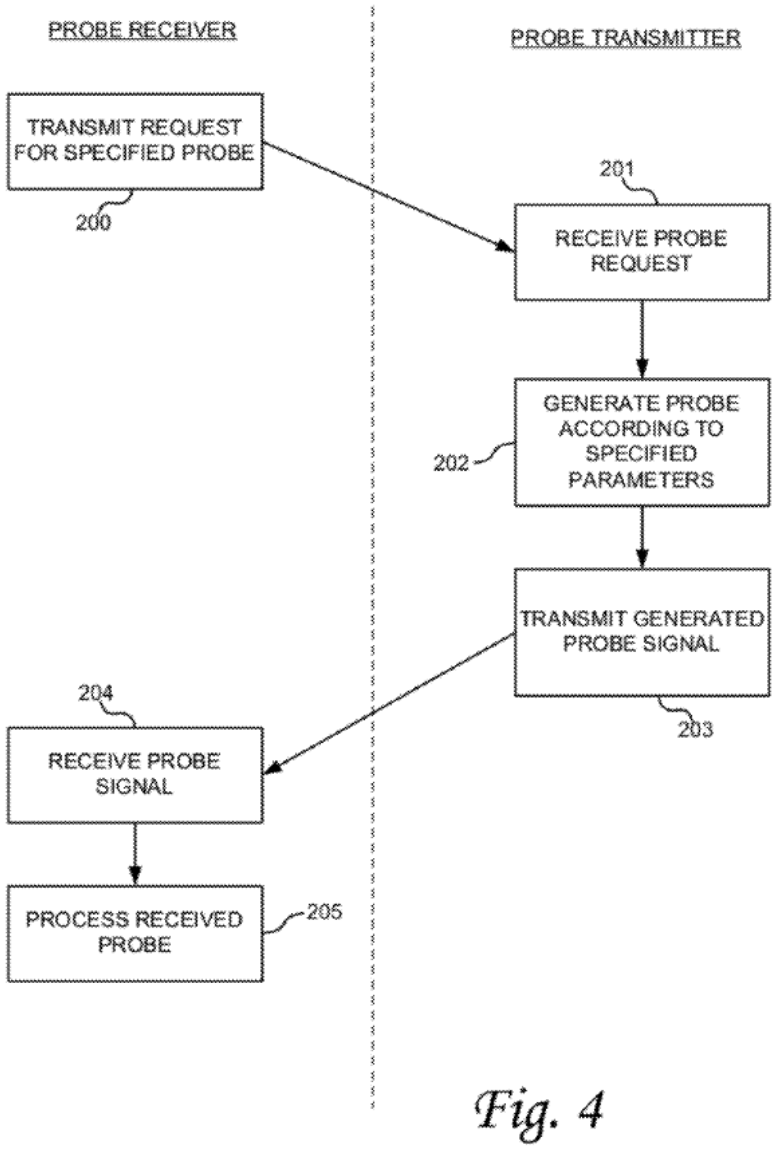


Fig. 4

'690 Patent, FIG. 4

124. The probe request may "specif[y] a plurality of parameters to be used . . . to generate a probe." *Id.* at 2:3–6. For example, in one embodiment, "at least one of the probe parameters indicates: a) a modulation profile for the probe; b) the payload content of the probe; c) the number of times to transmit the probe; d) the number of symbols for the payload of the probe; e) the preamble type for the probe; f) the cyclic-prefix length for the payload of the probe; g) the transmit power for the probe; and h) the transmit power scaling factor for the payload of the probe." *Id.* at

2:35–42. In addition, the probe request may specify a plurality of parameters that specify a form of the probe. *Id.* at 2:3–6.

B. Prosecution History of the '690 Patent

125. I have reviewed the prosecution history leading to the issuance of the '690 Patent. I note that Dr. Almeroth does not offer any summary or analysis of the '690 Patent's prosecution history in his Declaration.

126. Notably, during prosecution, the disputed terms discussed below and in Dr. Almeroth's declaration were understood by the Examiner and were not rejected as indefinite.

C. Disputed Terms of the '690 Patent

127. I understand that there is a dispute over one (1) claim term within Claim 1 and two (2) claim terms within Claim 9 of the '690 Patent. Below, I have reproduced Claims 1 and 9 of the in their entirety and have emphasized the terms that are in dispute.

1. A method comprising:

a) receiving in a first node, a probe request specifying a first plurality of parameters associated with the generation and transmission of a probe, wherein the first plurality of parameters at least specify content payload of the probe and a second node;

b) determining a second plurality of parameters associated with generation and transmission of the probe;

c) ***generating the probe in accordance with the first plurality of parameters and the second plurality of parameters, wherein the probe has a form dictated by the first plurality of parameters***; and

d) transmitting the probe from the first node to the second node.

'690 Patent, Claim 1.

9. A method comprising:

a) a first node transmitting a probe request to a second node, the probe request specifying a first plurality of probe parameters for a physical layer probe, ***the first plurality of probe parameters comprising a form for the probe including a modulation profile for the probe***;

> b) the first node receiving the probe from the second node, ***wherein the probe is generated in accordance with the first plurality of parameters and in accordance with a second plurality of parameters determined by the second node***.

'690 Patent, Claim 9.

128. I understand Dr. Almeroth opines that the following terms in the '690 patent are indefinite:

- "generating the probe in accordance with the first plurality of parameters and the second plurality of parameters, wherein the probe has a form dictated by the first plurality of parameters" (Claim 1)
- "wherein the probe is generated in accordance with the first plurality of parameters and in accordance with a second plurality of parameters determined by the second node" (Claim 9)
- "the first plurality of probe parameters comprising a form for the probe including a modulation profile for the probe" (Claim 9)

Almeroth Decl. ¶ 30.

129. I disagree. As discussed further below, Dr. Almeroth misinterprets the plain and ordinary meaning of these phrases to manufacture an inconsistency that does not exist.

1. "generating the probe in accordance with the first plurality of parameters and the second plurality of parameters, wherein the probe has a form dictated by the first plurality of parameters" (Claim 1)

130. With respect to Claim 1, Dr. Almeroth opines that "generating the probe in accordance with the first plurality of parameters and the second plurality of parameters" is indefinite because it is purportedly incompatible with the phrase "wherein the probe has a form dictated by the first plurality of parameters." *See* Almeroth Decl. ¶¶ 30, 83–84. This is because, according to Dr. Almeroth, "[b]y definition, the parameters define the form of a probe" and "[a] probe cannot be generated in accordance with 'the first plurality of parameters' and the 'second plurality of parameters,' but have its form dictated only by the 'first plurality of parameters' (as is

covered by the claim.)" Almeroth Decl. ¶ 30; *see also* ¶¶ 80–84. Dr. Almeroth's full statement from paragraph 30 is reproduced below:

> Claim 1 of the '690 Patent and its dependents are indefinite because "generating the probe in accordance with the first plurality of parameters and the second plurality of parameters" is incompatible with "wherein the probe has a form dictated by the first plurality of parameters." By definition, the parameters define the form of a probe. A probe cannot be generated in accordance with the "first plurality of parameters" and the "second plurality of parameters," but have its form dictated only by the "first plurality of parameters" (as is covered by the claim.)

131. I disagree. Dr. Almeroth's reasoning is based on an incorrect interpretation of the claims. Dr. Almeroth manufactures a requirement that any and all "parameters" relating to the *generation* of the probe necessarily define the *form* of the probe. *See* Almeroth Decl. ¶ 30; *see also* ¶ 84 ("By definition, 'parameters' define the form of the probe that will be generated"). This is inconsistent with how a POSITA would read the specification and claims of the '690 Patent.

a. The claim language is clear on its face that not all parameters relate to the "form" of the probe

132. Beginning with the claims as a starting point, Claim 1 plainly recites that there is a first plurality of parameters and a second plurality of parameters "wherein the probe has a form dictated by the first plurality of parameters." Thus, the language of the claim on its face does not require ***all*** parameters to dictate the form of the probe.

133. A POSITA would understand that what the claim requires is that parameters are specified in the probe request, and at least one of these parameters (*i.e.*, the first plurality) dictates the form of the probe. A POSITA would understand that the other parameters (*i.e.*, the second plurality and any additional parameters) need not specify the form of the probe.

134. My findings are further supported by the claim language in Claim 9, wherein Claim 9 similarly recites a "first plurality of probe parameters" specified by the probe request and a "second plurality of parameters determined by the [node which generates the responsive probe]."

Only the first plurality of probe parameters is said to "compris[e] a form for the probe." *See* '690 Patent, Claim 9. A POSITA would therefore understand that the parameters "determined by the [node which generates the responsive probe]" need not comprise a form for the probe.

135. It should also be noted that both Claim 1 and Claim 9 make a distinction between parameters that are *specified* in the probe request (such as the first plurality) and parameters that are *determined* (the second plurality). In both cases, only parameters that are specified in the probe request are said to relate to the "form" for the probe.

b. The specification further confirms a POSITA's understanding that not all parameters relate to the "form" of the probe

136. The specification is consistent. For example, the specification recites:

> The receiving node may generate a probe request that specifies a plurality of parameters to be used in such a "receiver determined" probe to generate a probe having the "form" specified by these parameters.

'690 Patent, 2:3–6; *see also id.* at 2:17–19 ("the probe that is transmitted in response to the probe request will have a form dictated by the parameters specified in the probe request").

137. This confirms a POSITA's understanding of the plain claim language, that the probe request specifies parameters to be used in generating a probe, and the form of the probe is specified by at least one of these parameters (*i.e.*, the first plurality).

138. Furthermore, a POSITA would understand the point of the probe request is for a node to generate a probe containing responsive information—information which can be used, for example, for channel assessment, network maintenance procedures, or off-site network diagnosis. *See id.* at 1:48–52, 4:25–27. *See also id.* at 2:20–27. A POSITA would therefore understand the claimed "second plurality of parameters" could, for example, include such responsive information. This is made clear in Claim 9, which expressly recites "a second plurality of parameters *determined by the second node*." These second plurality of parameters may be the parameters that are, for

example, returned in the payload of the probe and which do not necessarily determine the "form" of the probe.

c. Dr. Almeroth fails to show support for his view that all parameters define the "form" of the probe

139. Dr. Almeroth asserts "[b]y definition, 'parameters' define the form of the probe that will be generated." Almeroth Decl. ¶ 84; *see also* ¶ 30. I disagree. The only support Dr. Almeroth cites for this conclusion is column 2, line 6, which reads in full context: "[t]he receiving node ***may*** generate a probe request that specifies a plurality of parameters to be used in such a 'receiver determined' probe to generate a probe having the 'form' specified by these parameters." '690 Patent, 2:3–6 (emphasis added).

140. Based on my review and understanding of the specification, there is nothing in the above-mentioned passage ('690 Patent 2:3–6), that a POSITA would understand as limiting the "form." The specification makes clear that "the receiving node ***may*** generate a probe request" wherein the responsive probe has a "'form' specified by" *e.g.*, according to the probe request's one or more parameters that "may" include a "form" parameter. For example, the phrase uses the term "may," which is permissive and indicates that an exemplary embodiment is being described. There is also no indication of the Applicant's express intent to define the term "form." The passage does not state that form "is" or "means" something. Furthermore, the passage refers only to "these parameters," as in the plurality of parameters specified in the probe request. The passage gives no indication that other parameters (such as those determined by the probe-generating node) must also specify the form of the probe. As such, nothing here is inconsistent with the plain language of Claims 1 and 9.

141. A POSITA would find no support for Dr. Almeroth's view that "generating the probe in accordance with the first plurality of parameters and the second plurality of parameters" is incompatible with "the probe has a form dictated by the first plurality of parameters."

142. Based on the plain language of Claim 1, a POSITA could ascertain the scope of the claim with reasonable certainty. For example, a POSITA could ascertain, with reasonable certainty, whether a probe request specifies parameters, whether a probe is generated in accordance with those parameters, whether the probe is generated in accordance with a second plurality of parameters, and whether the probe has a form dictated by at least one of the parameters specified in the probe request.

143. For each of the reasons set forth above, it is my opinion that Dr. Almeroth has not shown that the scope of Claim 1 of the '690 Patent is not reasonably certain or is indefinite. *See also* ¶¶ 144–152, *infra*.

2. "wherein the probe is generated in accordance with the first plurality of parameters and in accordance with a second plurality of parameters determined by the second node" (Claim 9) / "the first plurality of probe parameters comprising a form for the probe including a modulation profile for the probe" (Claim 9)

144. According to Dr. Almeroth, Claim 9 is also indefinite for nearly the same reasons he opines that Claim 1 is indefinite. Dr. Almeroth's opinion, from paragraph 30 of his Declaration is reproduced below:

> Claim 9 of the '690 Patent and its dependents are indefinite because "wherein the probe is generated in accordance with the first plurality of parameters and in accordance with a second plurality of parameters determined by the second node" is incompatible with "the first plurality of probe parameters comprising a form for the probe including a modulation profile for the probe." By definition, the parameters define the form of a probe. A probe cannot be generated in accordance with the "first plurality of parameters" and the "second plurality of parameters," but have only the "first plurality of parameters" comprise its form (as is covered by the claim.)

145. I disagree. For the reasons discussed above, Dr. Almeroth is incorrect that "[b]y definition, the parameters define the form of a probe." *See e.g.*, ¶¶ 130–140, *supra*. A POSITA would not understand column 2, line 6 as defining or requiring all parameters to define the form of the probe. The language in that passage is permissive and exhibits no clear intent to define any term.

a. A POSITA would understand, in view of the intrinsic evidence, that not all parameters "compris[e] a form for the probe"

146. Further, the claim language makes clear that not all parameters must "compris[e] a form for the probe." Claim 9 recites "*the first plurality of probe parameters* comprising a form for the probe." A POSITA would understand the use of "comprising" to mean that other parameters can also be included in the "first plurality," in addition to the parameter(s) that specify a form for the probe. Dr. Almeroth's opinion improperly attempts to convert the open-ended "comprising" language to closed-ended "consisting of" language.

147. Dr. Almeroth also asserts that—because Claim 9 does not expressly recite the second plurality of parameters comprising a form for the probe—the claim (according to Dr. Almeroth) requires that *only* the first plurality of parameters determine the form. *See* Almeroth Decl. ¶ 84 ("the claims appear to cover the form of the probe being determined only by the parameters sent by the requesting node"). I disagree with his importation of the limitation "only." Claim 9 uses "comprising," indicating that the elements listed are necessary to satisfy the claim, but additional limitations can be added.

148. Thus a POSITA would not find it incompatible, based on the plain and ordinary meaning of the claim language, for a probe to be generated in accordance with the first and second plurality of parameters, wherein "the first plurality of probe parameters compris[es] a form for the probe."

149. In my opinion, a POSITA would be able to reasonably ascertain the scope of Claim 9 based on the plain and ordinary meaning of the claim language. For example, a POSITA would not have any difficulty ascertaining "wherein the probe is generated in accordance with the first plurality of parameters and in accordance with a second plurality of parameters determined by the second node." A POSITA would also not have any difficulty determining whether "the first plurality of probe parameters compris[es] a form for the probe including a modulation profile for the probe."

b. Among other things, Dr. Almeroth is incorrect that "both the requesting node and the transmitting node separately determine a 'plurality of parameters'" as if Claim 1 and Claim 9 are the same in this regard

150. I also note Dr. Almeroth asserts that Claims 1 and 9 require "both the requesting node and the transmitting node [to] separately ***determine*** a 'plurality of parameters associated with the generation' of the probe." Almeroth Decl. ¶ 83 (emphasis added). I disagree. Claim 1 recites a method comprising "determining a second plurality of parameters associated with the generation and transmission of the probe" not Claim 9. Further, Claim 1 does not specify which node determines these parameters.

151. In addition, the claims do not require the requesting node (*i.e.*, the node that transmits the probe request) to ***determine*** a plurality of parameters. Rather, Claims 1 and 9 both recite that the probe request ***specifies*** a plurality of parameters. Thus, Dr. Almeroth is simply incorrect about what the claims require.

152. Dr. Almeroth also asserts that the Claims 1 and 9 are somehow "unlike the disclosure." Almeroth Dec. ¶ 83. I disagree. This appears to be more akin to Dr. Almeroth providing an opinion related to the written description versus opining that a POSITA would not understand the claim terms with reasonable certainty. Regardless, as explained above, Dr.

Almeroth incorrectly interprets the claims, rendering his conclusion that the claims are unlike the disclosure also incorrect.

153. For each of the reasons set forth above, it is my opinion that Dr. Almeroth has not shown that the scope of Claim 9 of the '690 Patent is not reasonably certain or is indefinite.

IX. '682 PATENT

A. Overview of the '682 Patent

154. The '682 Patent is titled "Method And System For Service Group Management In a Cable Network" and was filed on January 9, 2018, and was issued on November 20, 2018. The '682 Patent claims priority to U.S. Application No. 15/434,673, filed on February 16, 2017 (now U.S. Patent No. 9,866,438), U.S. Application No. 15/228,703, filed on August 4, 2016 (now U.S. Patent No. 9,577,886), U.S. Application No. 13/948,444, filed on July 23, 2013 (now U.S. Patent No. 9,419,858), and U.S. Provisional Application No. 61/674,742, filed on July 23, 2012. Accordingly, for my analysis herein, I have assumed the date of July 23, 2012 as the earliest possible priority date for the '682 Patent.

155. The '682 Patent describes and claims a method and system for a "cable modem termination system (CMTS) [to] determine, for a plurality of cable modems served by the CMTS, a corresponding plurality of SNR-related metrics." '682 Patent, Abstract. The specification describes how the CMTS may assign cable modems ("CMs") into service groups based on the SNR-related metrics, where SNR means signal-to-noise ratio. In general, SNR is a ratio measurement of the (level of) signal to the (level of) noise with respect to the signal between the CMTS and CM. An exemplary system showing a CMTS and CMs is shown below in Figure 4A:

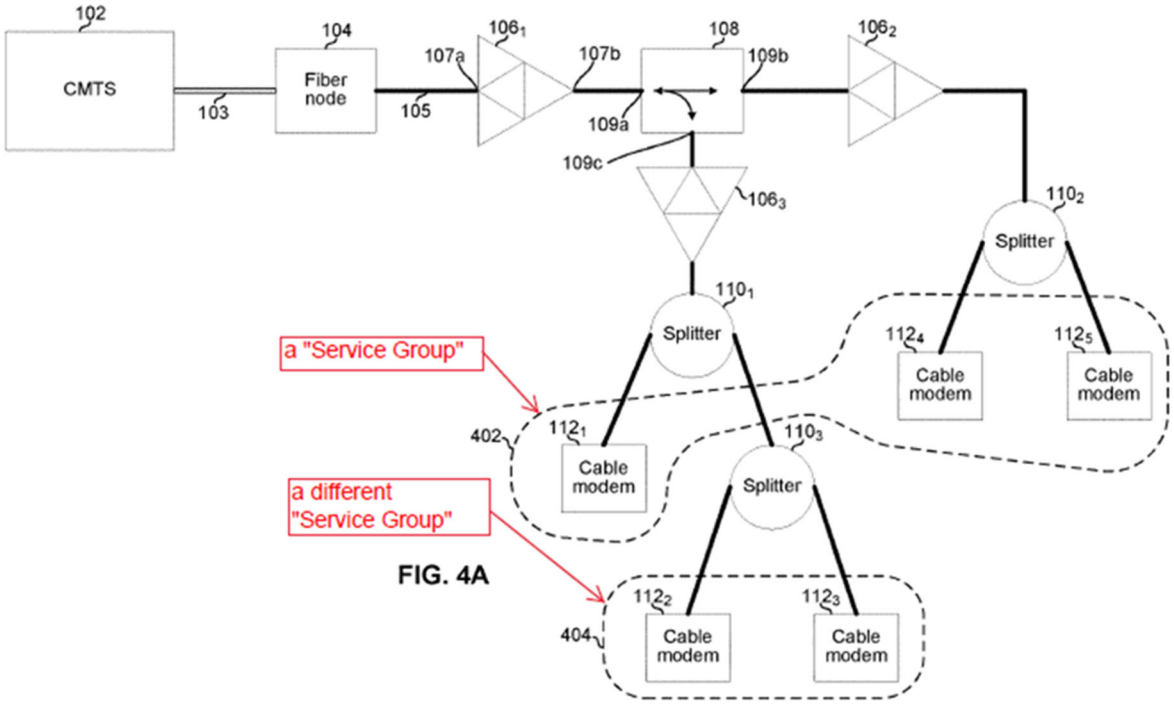


FIG. 4A

'682 Patent, FIG. 4A (annotated); *see also* 6:42–7:22, FIG. 4B.

156. Accordingly, the '682 Patent discloses that the CMTS builds a composite view of the various cable modems' SNR-related levels (*e.g.,* worst case SNR levels), wherein the '682 Patent calls these various SNR-related levels "SNR profiles." *Id.* at 3:53–58 ("SNR at a particular frequency or SNR over a range of frequencies (an SNR profile).").

157. The specification of the '682 Patent, as an example, describes that a plurality of CMs that share similar SNR-related metrics within a "service group" are said to have a "composite [worst-case] SNR profile for a [particular] service group." *Id.* at 4:14–17, 5:7–12.

B. Prosecution History of the '682 Patent

158. I have reviewed the prosecution history leading to the issuance of the '682 Patent. I note that Dr. Almeroth does not offer any summary or analysis of the '682 Patent's prosecution history in his Declaration.

159. Notably, during prosecution, the disputed terms discussed below and in Dr. Almeroth's declaration were understood by the Examiner and were not rejected as indefinite.

Furthermore, during prosecution, the Examiner not only understood the disputed terms and did not reject them as indefinite, but specifically cited to one of the disputed term as one of the reasons that this claim was allowable over prior art. *See* Exhibit D, 04/03/2018 Non-Final Rejection, 24–27 (ENTROPIC_CHARTER_0005329–0005332).

C. Disputed Terms of the '682 Patent

160. I understand that there is a dispute over two (2) claim terms within Claim 1 of the '682 Patent. Below I have reproduced Claim 1 in its entirety, and have emphasized the terms that are in dispute.

> 1. A method comprising:
>
> determining, by a cable modem termination system (CMTS), for each cable modem served by said CMTS, a corresponding signal-to-noise ratio (SNR) related metric;
>
> assigning, by said CMTS, each cable modem among a plurality of service groups based on a respective corresponding SNR-related metric;
>
> generating, by said CMTS for each one of said plurality of service groups, ***a composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR-related metrics corresponding to said one of said plurality of service groups***;
>
> selecting, by said CMTS, one or more physical layer communication parameter to be used for ***communicating with said one of said plurality of service groups*** based on said composite SNR-related metric; and
>
> communicating, by said CMTS, with one or more cable modems ***corresponding to said one of said plurality of service groups*** using said selected one or more physical layer communication parameter.

'682 Patent, Claim 1.

1. "a composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR-related metrics"

161. I understand that Charter asserts that the term "a composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR-related metrics" is indefinite because there is no way to determine what "a composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR-related metrics" means and has provided the expert opinion

of Dr. Almeroth in support of its position. I disagree and set forth my rebuttal herein. As discussed further below, it is my opinion that Dr. Almeroth has not identified any ambiguities or lack of reasonable certainty in the claims when considered in light of the intrinsic record.

a. I disagree that "worst case" and "composite worst case SNR" are the "same thing" in the context of Claim 1 or are otherwise indefinite

162. Dr. Almeroth begins by explaining his understanding of the disclosure of the '682 Patent. *See* Almeroth Decl. ¶¶ 85–91. He contends that the "composite worst-case SNR profile" for a service group is "the worst case SNR for [each] subcarrier among the CMs in that particular service group." *See* Almeroth Decl. ¶ 89 (quoting '682 Patent, 5:42–46).

163. Dr. Almeroth then provides an example of how he understands the "composite worst-case SNR profile" to be determined: "if there are 5 cable modems (CM[A] - CM[E]) in a hypothetical service group, the 'composite worst-case SNR profile' for that service group reflects the worst SNR of all the cable modems in the service group for each subcarrier . . . In this example, CM[A] has the worst SNR at subcarriers 2, 5 and 7, CM[B] has the worst SNR at subcarrier 1, CM[C] has the worst SNR at subcarrier 6, CM[D] has the worst SNR at subcarriers 3 and 8, and CM[E] has the worst SNR at subcarrier 4." Almeroth Decl. ¶ 90. Dr. Almeroth annotates Figure 2B to support his example:

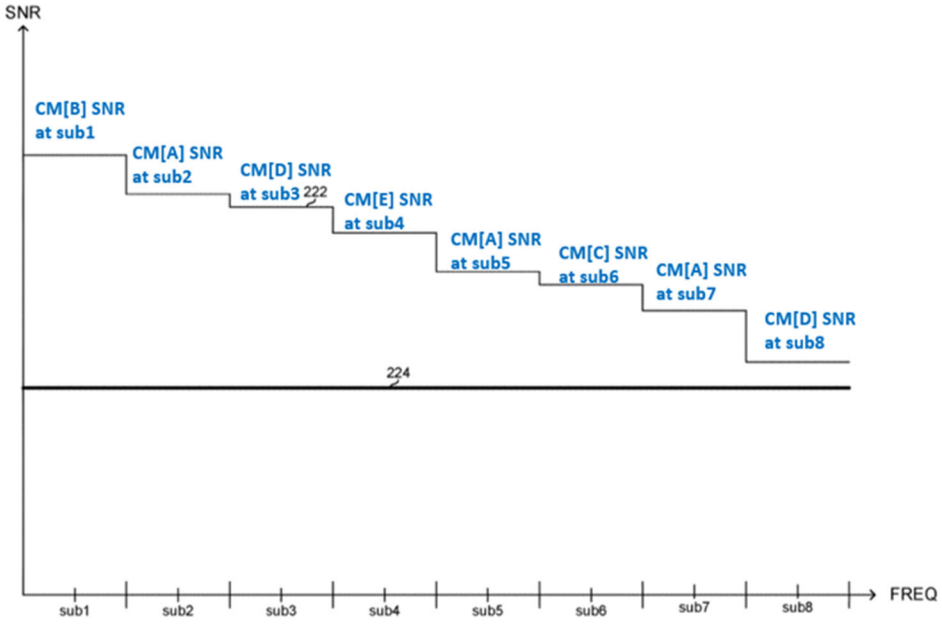


FIG. 2B

Almeroth Decl. ¶ 90.

164. Dr. Almeroth's example and annotations of Figure 2B misrepresent what the specification says about what is being described in Figure 2B. Specifically, Dr. Almeroth appears to be arguing that the steps each relate to a single CM's worst SNR, and that those worst SNRs are used to determine the "composite worst-case SNR profile." Almeroth Decl. ¶ 90.

165. However, the specification makes clear that "line 222 in FIG. 2B represents ***a composite*** worst-case SNR profile for one or more CM(s) in the HFC network to which the message 202 is destined." '682 Patent, 4:9–12 (emphasis added). The specification further explains that while the CMs report their SNR readings, only the CMTS can build a composite view of all reporting CMs based on the collective CM readings. *Id*. at 4:40–56. From that information, the CMTS assigns CMs into service groups. *Id*.

166. The specification further explains, that the exemplary profile line 222, is based on a "minimum desired headroom" "228" needed to reliably have a robust enough signal to overcome

the noise, the CMTS accordingly selects corresponding "physical layer [communication] parameters" to ensure reliable communications with each CM within a service group. '682 Patent, 5:13–20. A POSITA would understand that this means that the exemplary line 222 in Figures 2B and 2C shows the ceiling that the CMTS must transmit at for all CMs in the entire service group to reliably communicate. Below I reproduce Figure 2C of the '682 Patent for further clarification:

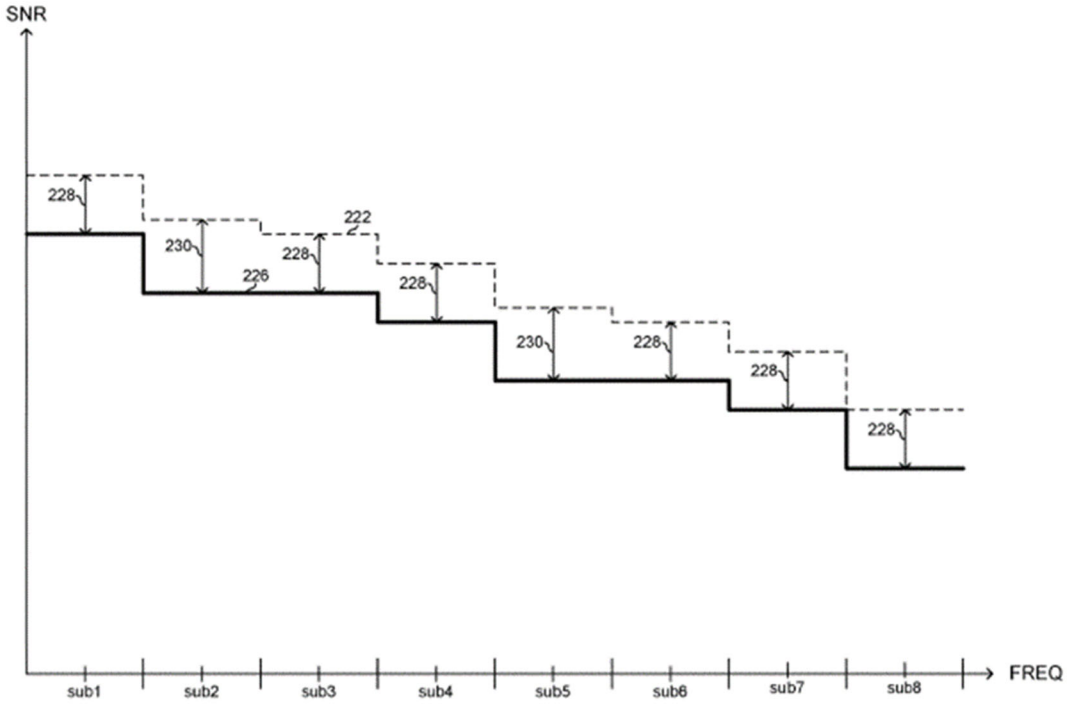


FIG. 2C

167. The rest of Dr. Almeroth's opinion focuses on how "composite worst-case SNR profile" does not have a plain and ordinary meaning. He concludes that"[t]here is no way to know how the 'composite SNR-related metric' can be 'based *at least in part on*' the 'worst-case SNR profile' since the two refer to the same thing." *See* Almeroth Decl. ¶ 96 (emphasis in original).

168. Dr. Almeroth's opinion mischaracterizes the difference between a "composite SNR-related metric" and a "worst-case SNR profile." The specification describes the "composite SNR-related metric" and "a worst-case SNR profile" as different things. While the specification describes how "worst-case SNR profile" must be a profile that in some way takes into account the

worst-case SNR of a cable modem or a service group, a "composite SNR-related metric" need not inherently involve worst-case SNR. '682 Patent, 4:3–20, 4:43–5:6, 5:7–20.

169. The '682 Patent discusses the *composite SNR-related metric* as being a composite of metrics in the context of worst-case SNR because that is part of the disclosed invention: in one embodiment, using the worst-case SNR in this way could allow for more efficient utilization of an HFC network to improve its overall data throughput and better overall data throughput for the cable modems in that network. '682 Patent, 5:40–57; *see also id.* at 4:25–28. Accordingly, the *composite SNR-related metric* could also include the ***best-case*** SNR, an ***average*** SNR, or some other SNR-related metric entirely. Claim 1 of the '682 Patent discloses and the specification teaches that a *composite SNR-related metric* need only be based "at least in part on a worst-case SNR profile." '682 Patent Claim 1, 4:25–28, 5:42–46. The *composite SNR-related metric* could also be based in part on other SNR profiles or SNR-related metrics. *Id.*

b. I disagree with Dr. Almeroth's opinion that "worst case" SNR is unintelligible or always 0 in the context of Claim 1

170. Dr. Almeroth similarly misconstrues what "worst-case" means. *See* Almeroth Decl. ¶ 94. Dr. Almeroth contends, without any explanation, that the "worst case" SNR will always be an SNR of 0, and thus a "worst-case SNR profile" would contain only 0s and consequently be unintelligible. His position seems to be that because an SNR profile of only 0s is nonsensical, a "worst-case SNR profile" must actually be referring to a "composite worst-case SNR profile." Almeroth Decl. ¶ 94. Dr. Almeroth's position would require one to assume (erroneously so) that SNR is a static value unrelated to data throughput. Even so, neither the '682 Patent specification nor the claims requires that a "worst case" SNR always be zero.

171. Taken together, Dr. Almeroth's mischaracterization of the individual terms making up the claim term "a composite SNR-related metric based at least in part on a worst-case SNR

profile of said SNR-related metrics" is an attempt to create ambiguity and indefiniteness where there is none.

172. Thus, it is my opinion that there is no ambiguity regarding how to determine "a composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR-related metrics." The specification clearly teaches that the purpose of the composite SNR is to group modems, at least in part, by composite SNR performance such that one modem with a lower performance does not reduce the potential throughput of every modem in a group. As discussed above, a POSITA would understand that the intrinsic record supports the plain and ordinary meaning such that a *composite SNR-related metric* need only be based at least in part on *a worst-case SNR profile*.

2. "[communicating with/corresponding to] said one of said plurality of service groups"

a. Among other things, Dr. Ameroth is wrong that there is no antecedent basis

173. I understand that Charter asserts that the term "[communicating with/corresponding to] said one of said plurality of service groups" is indefinite because there is no identified or antecedent "one of said plurality of service groups" to which "said one of said plurality of service groups" refers and has provided the expert opinion of Dr. Almeroth in support of its position. I disagree and set forth my rebuttal herein.

174. Dr. Almeroth's opinion misses the clear antecedent basis in Claim 1

175. In my opinion, the claim term(s) "[communicating with/corresponding to] said one of said plurality of service groups" should be construed according to its plain and ordinary meaning because 1) Dr. Almeroth's fails to identify the antecedent clearly listed in the prior element of Claim 1, and 2) the meaning of the words as they are read in the content of the full claim are abundantly clear. Dr. Almeroth appears to only write a single paragraph of merely three sentences

and two citations for the proposition that this claim term is indefinite. *See* Almeroth Decl. ¶ 97. Dr. Almeroth's ultimate opinion as to this claim term is that "[t]here is no antecedent in the claim for 'said one of said plurality of service groups,' and there is no way to know which service group among the 'plurality of service groups' is being referred to." *Id.*

176. However, the antecedent basis is clearly contained in the prior claim element. I have emphasized the relevant portions of the claim here to demonstrate that Dr. Almeroth ignores that there are two steps of antecedent basis that the elements rely on:

> 1. A method comprising:
>
> determining, by a cable modem termination system (CMTS), for each cable modem served by said CMTS, a corresponding signal-to-noise ratio (SNR) related metric;
>
> assigning, by said CMTS, each cable modem among a **plurality of service groups** based on a respective corresponding SNR-related metric;
>
> generating, by said CMTS for each one of said **plurality of service groups**, a composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR-related metrics *corresponding to said* one of said plurality of service groups;
>
> selecting, by said CMTS, one or more physical layer communication parameter to be used for *communicating with said* one of said plurality of service groups based on said composite SNR-related metric; and
>
> communicating, by said CMTS, with one or more cable modems *corresponding to said* one of said plurality of service groups using said selected one or more physical layer communication parameter.

'682 Patent, Claim 1 (emphasis added).

177. When the claim language is viewed in total, it is clear that there is not only an antecedent basis, but that a POSITA would be able to follow each element of Claim 1 and understand the invention. The specification identifies that an advantageous embodiment would be to perform Claim 1 for as many service groups in the plurality of service groups as preferred in order to achieve superior cable modem performance in the network. '682 Patent, Abstract, 5:40–57.

178. A POSITA would further understand that a composite SNR-related metric generated for service group A, for example, would be the same composite SNR-related metric and same service group in the selecting and communicating elements of Claim 1. Nonetheless, the claimed invention only ***requires*** communicating with a single service group of the plurality of service groups in the selecting and communicating elements of Claim 1. As such, Dr. Almeroth's assertion that one cannot determine which service group is being referred to does not create any indefiniteness, and the claim term should be construed according to its plain and ordinary meaning.

179. For each of the reasons set forth above, it is my opinion that Dr. Almeroth has not shown that the scope of Claim 1 of the '682 Patent is not reasonably certain or is indefinite.

X. ADDITIONAL REMARKS

180. I currently hold the opinions expressed in this Declaration. But my analysis may continue, and I may acquire additional information and/or attain supplemental insights that may result in added observations. Additionally, it is my understanding that discovery is ongoing in this matter. I reserve the right to rely on additional discovery that occurs after this Declaration is submitted. To the extent that additional information becomes available relevant to the opinions expressed in this Declaration, I will update my opinions as appropriate.

181. I also reserve the right to respond to any additional arguments or opinions raised by Charter or Charter's expert(s). I further reserve the right to respond to any new positions raised by Charter or respond to any further expert declaration provided by Charter regarding claim construction issues.

I hereby declare that all statements made are of my own knowledge are true and that all statements made on information and belief are believed to be true. I further declare that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of the Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this proceeding.

Dated: April 14, 2023

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